Fourteenth
Annual
Catalogue.

The State Agricultural College.

Fort Collins, Colorado.

1892=1893.

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MAIN BUILDING, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

REGISTER

OF THE

OFFICERS AND STUDENTS

OF

The State Agricultural College

FORT COLLINS, COLORADO.

COURSES OF STUDY

AND

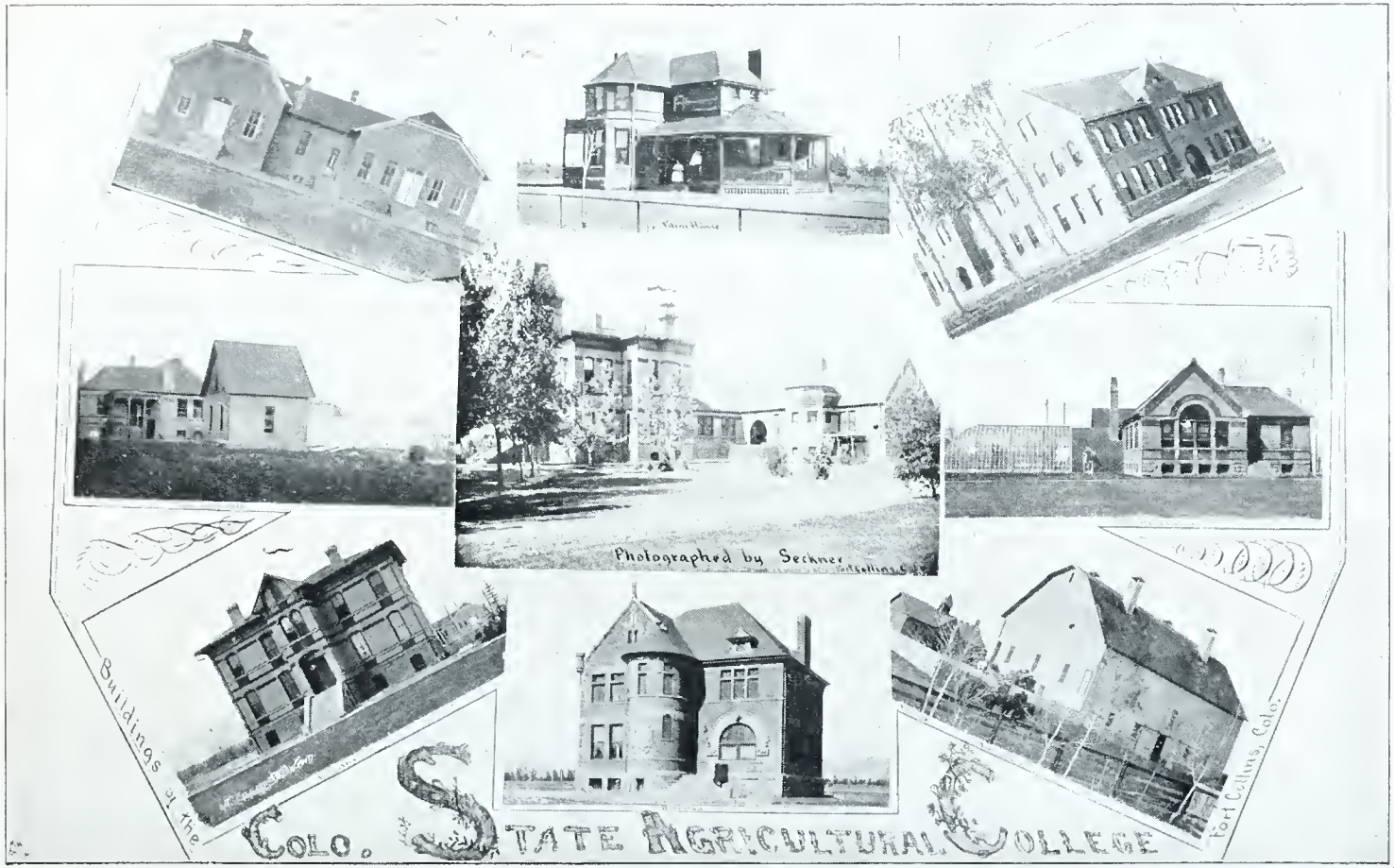
GENERAL INFORMATION.

1892-1893.

FORT COLLINS, COLO.:
THE COURIER PRINTING & PUBLISHING CO.
1893.

The State Board of Agriculture.

		Term Expires.
HON. A. LINDSLEY KELLOGG,	Rocky Ford,	1901
HON. JAMES L. CHATFIELD,	Gypsum,	1901
HON. JOSEPH S. McCLELLAND,	Fort Collins,	1899
HON. JAMES E. DuBOIS,	Fort Collins,	1899
HON. A. L. EMIGH,	Fort Collins,	1897
HON. JOHN J. RYAN,	Loveland,	1897
HON. FRANK J. ANNIS,	Fort Collins,	1895
HON. CHARLES H. SMALL,	Pueblo,	1895
HIS EXCELLENCY, GOV. DAVIS H. WAITE,	*ex-officio.*	
PRESIDENT ALSTON ELLIS.	*ex-officio.*	



COLLEGE BUILDINGS, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

OFFICERS OF THE BOARD.

Hon. A. L. Emigh, - - - - - - - - - President
Hon. Daniel W. Working, - - - - - - - - Secretary
Hon. Charles H. Sheldon, - - - - - - - - Treasurer

Committees.

EXECUTIVE.

J. S. McClelland. J. J. Ryan. A. L. Kellogg.

The President of the Board, } *ex-officio*.
The President of the College, }

FINANCE.

J. J. Ryan. J. E. DuBois. F. J. Annis.

FARM AND STOCK.

J. S. McClelland. J. L. Chatfield. A. L. Kellogg.

FACULTY, LIBRARY, AND COURSES OF STUDY.

A. L. Kellogg. Alston Ellis. J. J. Ryan.

BOTANY, HORTICULTURE, AND ENTOMOLOGY.

F. J. Annis. J. J. Ryan. C. H. Small.

MATHEMATICS, ENGINEERING, AND MILITARY SCIENCE.

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MECHANICS AND CHEMISTRY.

J. E. DuBois. J. S. McClelland. C. H. Small.

COLLEGE BUILDINGS AND PERMANENT IMPROVEMENTS.

C. H. Small. J. E. DuBois. J. L. Chatfield.

FACULTY.

ALSTON ELLIS, A. M., PH. D., LL. D.,
President, and Professor of Political Economy and Logic.

JAMES W. LAWRENCE, B. S.,
Professor of Mechanics and Drawing.

MAUD BELL,
Professor of History, Literature, and Languages.

DAVID O'BRINE, E. M., D. Sc., M. D.,
Professor of Chemistry and Geology.

LOUIS G. CARPENTER, M. S.,
Professor of Physics and Irrigation Engineering.

CHARLES S. CRANDALL, M. S.,
Professor of Botany and Horticulture.

JOHN C. DENT, CAPT., 20TH INFANTRY, U. S. ARMY,
Professor of Military Science and Tactics.

CLARENCE P. GILLETTE, M. S.,
Professor of Zoology and Entomology.

WALTER J. QUICK, B. S.,
Professor of Agriculture.

GRACE ESPY PATTON, B. S.,
Professor of English and Stenography.

WILLIAM J. MEYERS, B. S.,
Professor of Mathematics.

DANIEL W. WORKING, B. S.,
Secretary of Faculty.

W. H. GOODALL, B. L.,
Instructor in Elocution and Calisthenics.

CELIA MAY SOUTHWORTH,
Librarian.

Assistants.

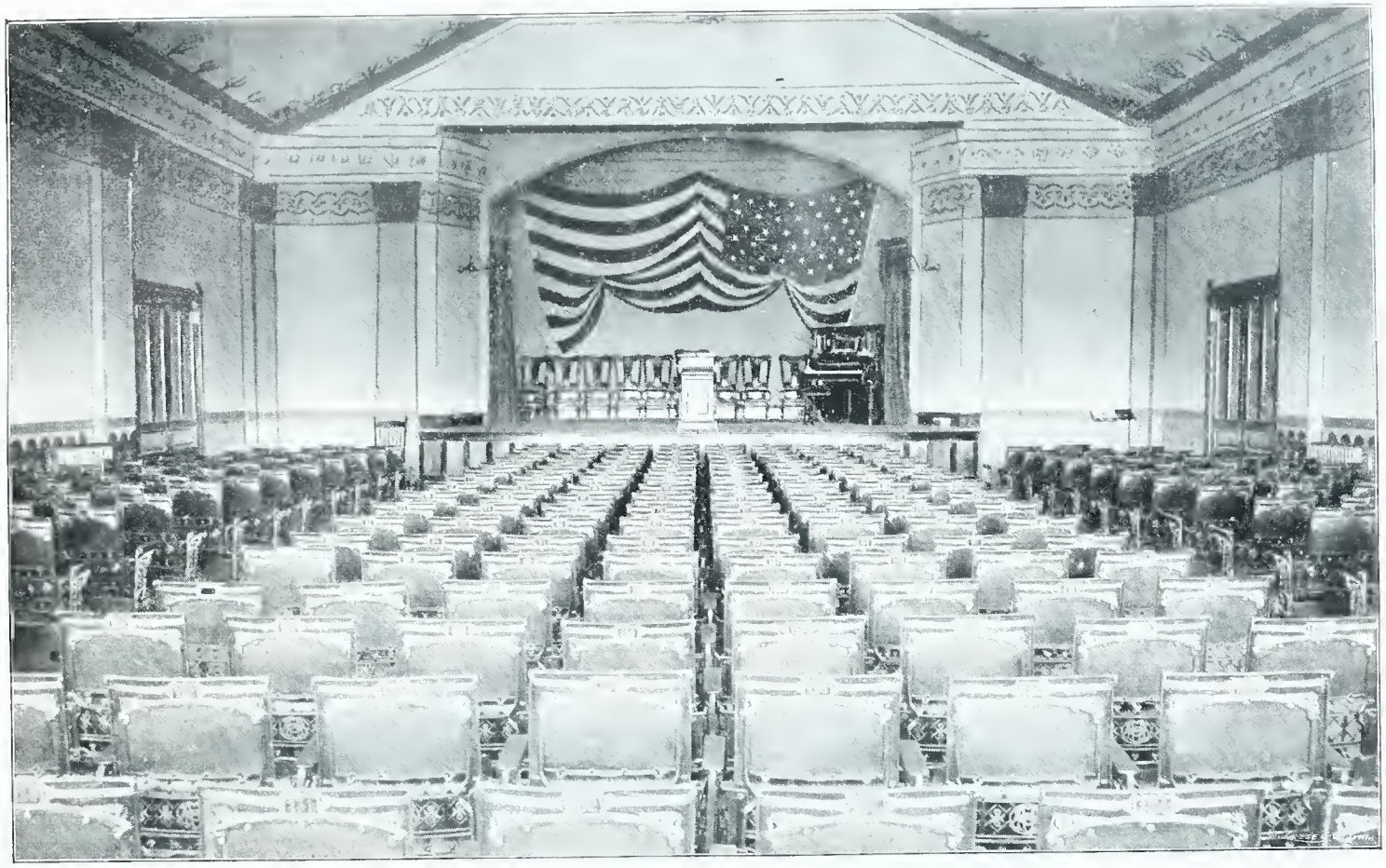
FRANK L. WATROUS, *Agriculture.*

L. D. CRAIN, B. M. E., *Mechanics and Drawing.*

J. D. STANNARD, B. S., *Physics and Engineering.*

CHARLES F. BAKER, B. S., *Zoology and Entomology.*

CHARLES J. RYAN, *Chemistry.*



COLLEGE CHAPEL, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

THE STATE EXPERIMENT STATION.

BOARD OF CONTROL:

THE STATE BOARD OF AGRICULTURE.

EXECUTIVE COMMITTEE IN CHARGE.

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HON. A. L. KELLOGG.

THE PRESIDENT OF THE BOARD AND THE PRESIDENT OF THE COLLEGE.

STATION COUNCIL.

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WALTER J. QUICK, B. S., - DIRECTOR AND AGRICULTURIST

C. S. CRANDALL, M. S., - HORTICULTURIST AND BOTANIST

DAVID O'BRINE, E. M., D. Sc., M. D., - - CHEMIST

L. G. CARPENTER, M. S., - METEOROLOGIST AND IRRIGATION ENG.

C. P. GILLETTE, M. S., - - - ENTOMOLOGIST

DANIEL W. WORKING, B. S., SECRETARY.

ASSISTANTS.

FRANK L. WATROUS, - - - - AGRICULTURE

EDWARD McCABE, - - - - HORTICULTURE

R. E. TRIMBLE, B. S., - - - - METEOROLOGY

CHARLES F. BAKER, B. S., - - - - ENTOMOLOGY

CHARLES J. RYAN, - - - - CHEMISTRY

SUB-STATIONS.

F. A. HUNTLEY, B. S. A., - - - SUPERINTENDENT

Arkansas Valley Station, Rocky Ford, Colorado.

G. F. BRENINGER, - - - SEPERINTENDENT

Divide Station, Table Rock, Colorado.

FRANK BEACH, B. S., - - - SUPERINTENDENT

San Luis Valley Station, Monte Vista, Colorado.

Register of Students.

1892-1893.

SENIOR CLASS.

John Bloomfield,	Meeker,	Colorado
Samuel Latimer Boothroyd,	Arkins,	"
Charles James Gilkison,	La Porte,	"
Ida Maud Lewis,	Timnath,	"
William John Ralph,	Fort Collins,	"
Raymond F. Walter,	" "	"
William Watson Willard,	Aspen.	"

JUNIOR CLASS.

Herbert Andrew Black,	Fort Collins,	Colorado
Philo Kneeland Blinn,	Berthoud,	"
Lulu Annette Brooks,	Portland,	Michigan
Jacob Hover Cowen,	Hotchkiss,	Colorado
Will Harman Fairfield,	Berthoud,	"
William B. Garrett,	Fort Collins,	"
Minnie Frances Harrington,	" "	"
Herbert Salter Kendall,	" "	"
Celia May Southworth,	Denver,	"
John Philip Walsh,	Delta,	"
Harry Falis Williams,	Greenland,	"
Paul McIntosh Wright,	Fort Collins,	"

SOPHOMORE CLASS.

Fred Alford,	Fort Collins,	Colorado
Edith Gertrude Boothroyd,	Arkins,	"
Florence Jessie Boothroyd,	"	"
Kate Dorthe Brandis,	Fort Collins,	"
Henry Alvin Calkins,	Harris,	"
Frederick William Culver,	Longmont,	"
Loren Bradley Curtis,	Littleton,	"
Joseph Swallow Davis,	Denver,	"
George Edgar Garrett,	Fort Collins,	"
Mabel Giddings,	" "	"
William Franklin Gilkison,	La Porte,	"
Ella Goldsborough,	Fort Collins,	"
Selden Foster Herrick,	Denver,	"
Elizabeth Ellen Ish,	Fort Collins,	"
Ella Sophia Lambert,	" "	"
Seth Curtis Lewis,	Timnath,	"
Richard Appleton Maxfield,	Rifle,	"
Abner Sherman McKee,	Montrose,	"
Edgar Avery Mead,	Greeley,	"
Guy Miller,	Longmont,	"
Duane Frank Miner,	Fort Collins,	"
George William Nelson,	Denver,	"
Grafton St. Clair Norman,	Hamilton,	Ohio
Christian Peter Pels,	Raton,	New Mexico
Fannie Christina Schelt,	Fort Collins,	Colorado
Walter Kolb Starbird,	Longmont,	"
Edith Walter,	Fort Collins,	"
Nathan C. Warren,	" "	"
Ray C. Watson,	Greeley,	"
Hoyt Douglas Whipple,	Berthoud,	"

FRESHMAN CLASS.

Henry Franklin Alps,	Loveland,	Colorado
Emil Affolter,	Longmont,	"

Frank Affolter,	Longmont,	Colorado.
Thomas George Balmain,	Hillside,	"
James Allison Blair,	Loveland,	"
George Bloomfield,	Meeker,	"
Edith Emily Boyce,	Little Cressingham,	England
Albert Alford Boyd,	Loveland,	Colorado
Walter Martin Brandis,	Fort Collins,	"
Calla Davis Bullard,	Loveland,	"
Alfred Hiram Bungardt,	Kansas City,	Missouri
Stephen Theodore Burkhard,	Trinidad,	Colorado.
Arthur White Bush,	Boulder,	"
Richard Turner Calkins,	Harris,	"
George Alfred Carlson,	Platteville,	"
Charles Edward Clark,	Elbert,	"
Roy Decker,	Fort Collins,	"
Walter George Decker,	" "	"
Sarah Gertrude Dix,	Loveland,	"
Nettie Evans,	Fort Collins,	"
Arthur St. John Ferguson,	Greeley,	"
Ralph Otto Ficht,	Denver,	"
Mark Hudson Flinn,	Loveland,	"
Alexander Wilson Fullerton,	Denver,	"
Henry Bryant Fullerton,	"	"
Bertram Alden Gage,	Fort Collins,	"
Charles Milton Garrett,	" "	"
Carl Newton Gleason,	Kiowa,	"
Allen Greenacre,	Fort Collins,	"
Mabel Josephine Hahn,	Loveland,	"
David Cyrus Harned,	Livermore,	"
Archie Jesse Harris,	Fort Collins,	"
Robinson William Hawley,	" "	"
Ralph Henry Hess,	Loveland,	"
William Ashton Hilton,	"	"
Guy Surinus Hooper,	Greeley,	"
Leslie Fowler Hoover,	Denver,	"

Herman Howard,	Greeley,	Colorado
John Blackmore Lansing,	Pueblo,	"
James Mifflin Loud,	Fort Robinson,	Nebraska
Emmet Cleburne McAnelly,	Fort Collins,	Colorado
Robert Ray McCain,	" "	"
Homer Francis McGinley,	Timnath,	"
Ralph Emery Metcalf,	Fort Collins,	"
Jessie Salenia Moore,	" "	"
Olof Wallfred Nyberg,	Pueblo,	"
Perry Hjalmer Nyberg,	"	"
Ida Patterson,	Fort Collins,	"
Webb Allen Patton,	" "	"
Jennie Peterson,	Timnath,	"
Smith Durie Philip,	Fort Lupton,	"
Frank Piatt,	Fort Collins,	"
Mamie Elizabeth Prendergast,	" "	"
Henry Read,	Denver,	"
Helene Jeanette Rhodes,	Ogden,	Utah
Albert Jason Rosenow,	Fort Collins,	Colorado
Carrie Ellen Sadler,	Beebe,	Arkansas
Robert Winfred Sears,	Greenhorn,	Colorado
Alice Etheleen Silcott,	Manhattan,	"
George Augustus Smith,	Fort Collins,	"
Ross Courtney Stephenson,	" "	"
Sprague Lucius Stewart,	Denver,	"
Neil Carmichael Sullivan,	Longmont,	"
Hiram Hubert Tannar,	Raymer,	"
Everett Washburn Taylor,	Winona,	"
William Selman Watson,	Denver,	"
Robert Samuels Weldon,	Arkins,	"
Fred Montgomery Westlake,	Florence,	"
Frank Newell Wilcox,	Ragan,	Nebraska
Harry Charles Williams,	Aspen,	Colorado
Percy Warren Williams,	Denver,	"

PREPARATORY CLASS.

Grace Amelia Bates,	Fort Collins,	Colorado
Fredrick Schiller Bell,	Highlands,	"
Sperry Bungardt,	Kansas City,	Missouri
Ezekiel Myron Bushnell,	Loveland,	Colorado
George William Butler,	Longmont,	"
John Charles Butler,	Lyons,	"
Orlie Lee Buttorff,	Platteville,	"
Henry Leo Byrnes,	Aspen,	"
William John Byrnes,	"	"
Walter C. Cory,	Fort Collins,	"
Allen Frederick Davis,	Westcliffe,	"
Myrna May Dix,	Loveland,	"
Fred William Dunning,	Pueblo,	"
Max Finch,	Platteville,	"
Martha Rose Gilkison,	La Porte,	"
Charles Mantz Hottel,	Fort Collins,	"
Robert Ryan Johnston,	Pueblo,	"
Ralph Lapham,	Lyons,	"
Clarence Lines,	Platteville,	"
Herbert Martin,	Alamosa,	"
Benjamin Waldo McCloskey,	Colorado Springs,	"
Clark Otto McGavic,	Denver,	"
Walter D. Moore,	"	"
Willie Crawford Nisbet,	Pueblo,	"
George Henry Rist,	Loveland,	"
Augustus Oury Robbins,	Denver,	"
Henry Clark Smith,	Woodstock,	Ohio
Matt Leighton Stanley,	Abbey,	Colorado
Charles Eugene Towner,	Fort Collins,	"
William Lewis Wade,	Paonia,	"
Marshall Ragland Westcott,	Aspen,	"
Fred Kirby Wollaston,	Denver,	"
William Robert Wright,	Fort Collins,	"
Josie Yattau,	Loveland,	"

SPECIAL STUDENTS.

Fannie Louisa Barnes,	Fort Collins,	Colorado
Maria Emma Beeson,	Loveland,	"
Eva H. Cushing,	Fort Collins,	"
Eugene Evans,	Denver,	"
Agnes Hawley,	Fort Collins,	"
Minerva Huberty,	" "	"
George Morrison McKimmie,	Denver,	"
Clara Ella Mitchell,	Fort Collins,	"
Laura Belle Mitchell,	" "	"
James M. Moore,	" "	"
Lena Moore,	" "	"
Charles V. Parker,	" "	"
Charles A. Parlin,	Norwich,	Connecticut
Lillian Leon Phillips,	Fort Collins,	Colorado
Mabelle E. Picken,	" "	"
Henry H. Porter,	Indianapolis,	Indiana
Ralph Elliott Rugh,	Fort Collins,	Colorado
Jessie Grace Smith,	Loveland,	"
Mayme Olive Smith,	"	"
Jennie Swickard,	Denver,	"
Harlan Thomas,	"	"
William Edward Wallace,	"	"
Frank Lee Watrous,	Fort Collins,	Colorado
Anna Millicent Wills,	" "	"
Alice Lena Wills,	" "	"

SUMMARY.

Seniors	7
Juniors	12
Sophomores	30
Freshmen	71
Preparatory Students	34
Special Students	25
Total	179

GRADUATES.

1884.

George H. Glover, B. S., D. V. M., Veterinary Surgeon.....Denver, Colorado
Elizabeth Lawrence, B. S., *nee* Coy, at Home..Fort Collins, Colorado
Leonidas Loomis, B. S., Stockman..... " " "

1885.

Cora B. Blinn, B. S., at Home.....Berthoud, Colorado
Edna L. Hice, B. S., at Home.....Fort Collins, "
Lelia Robertson, B. S., *nee* Loomis, at Home.. " " "
Grace Espy Patton, B. S., Professor of English and Stenography, State Agricultural College.....Fort Collins, Colorado
Robert E. Trimble, B. S., Assistant to Meteorologist, State Experiment Station.....Fort Collins, Colorado
Helen Rigden, B. S., *nee* White, at Home..... " " "

1886.

Wilbert J. Sickman, B. S., Clerk of County Court.....Fort Collins, Colorado

1887.

Eleanor F. Gill, B. S., at Home.....Fort Collins, Colorado
Daisy E. Stratton, B. S., Stenographer.....Tallapoosa, Georgia
Lerah McHugh, B. S., *nee* Stratton, at Home..Fort Collins, Colorado
Edwin G. Nettleton, B. S., Engineer ..... Cocorrit, Sonora, Mexico

1888.

Lewis A. Coffin, B. S., Farmer.....Boise City, Idaho
Harvey H. Griffin, B. S., Assistant Agriculturist, Agricultural College.....Las Cruces, New Mexico
Josephine Lee, B. S., Teacher, City Schools.....Boulder, Colorado
Genevieve E. McLain, B. S., Teacher, State Normal School.....Peru, Nebraska

1889.

Lucy Bell, B. S., Teacher, City Schools.....Fort Collins, Colorado
Arthur L. Davis, B. S., Medical Student.....Denver, Colorado

1890.

Clarence V. Benson, B. S., Attorney-at-Law.....Loveland, Colorado
Velma V. Beebe, B. S., *nee* Benson, at Home .... " "
Burt C. Buffum, B. S., Professor Botany and Horticulture, State University.....Laramie, Wyoming
Charles A. Duncan, B. S., Farmer.....Timnath, Colorado
Newton C. Garbutt, B. S., Stenographer and Law Student.....Fort Collins, Colorado
Helen E. Lunn, B. S., Book-keeper..... " " "
Harry R. Temple, B. S., Steam Engineer.....Boulder, Colorado
Cora B. Thoman, B. S., at Home.....Fort Collins, Colorado
Mary L. Weaver, B. S., B. Ph., at Home ..... " " "

1891.

Charles R. Evans, B. S., Merchant.....Fort Collins, Colorado
Minnie E. McLain, B. S., Teacher..... " " "
John S. Calkins, B. S., Farmer.....Harris, Colorado

1892.

Charles W. Beach, B. S., Assistant Engineer, D. & R. G. Railroad.....Crested Butte, Colorado
Frank Beach, B. S., Superintendent San Luis Valley Experiment Station.....Monte Vista, Colorado
Alice Bell, B. S., Stenographer .....Fort Collins, Colorado
Samuel Bell, B. S., Medical Student .....Denver, "
Don A. Carpenter, B. S., Superintendent Iron Works.....Fort Collins, "
Porter J. Preston, B. S., Engineer.....Longmont, Colorado
Albert J. Sedgwick, B. S., City Editor the *Express*.....Fort Collins, Colorado
Lewis L. Stimson, B. S., Surveyor.....Greeley, Colorado
Frank H. Thompson, B. S., Engineer ... ...North Platte, Nebraska

ALUMNI ASSOCIATION.

OFFICERS:

President,	GRACE ESPY PATTON
Vice-President,	ALBERT J. SEDGWICK
Secretary,	CORA B. THOMAN
Treasurer,	CLARENCE V. BENSON

EXECUTIVE COMMITTEE:

President. Vice-President. Secretary.

Lerah S. McHugh. Lewis L. Stimson.

COURSES OF STUDY.

Preparatory Year.

FIRST TERM.

Arithmetic	Wentworth
United States History	Johnston
English Analysis and Composition	Reed and Kellogg
Drawing	Free-hand

Labor: { Farm, ten weeks. / Shop, three weeks.

SECOND TERM.

Arithmetic	Wentworth
United States History	Johnston
English Analysis and Composition	Reed and Kellogg
Drawing	Free-hand

Labor: Shop.

THIRD TERM.

Arithmetic	Wentworth
Civil Government	Townsend's Shorter Course
Word Analysis and Composition	Swinton
Drawing	Free-hand

Labor: { Shop, two weeks. / Garden, nine weeks.

Military Drill daily. Ladies take Calisthenics two hours per week. Rhetorical work one hour per week. Readings from American Men of Letters one hour per week.

Freshman Year.

FIRST TERM.

Algebra ..... Wentworth
Composition and Rhetoric ..... Lockwood
Botany ..... Gray's Lessons
History ..... Sheldon
Labor: { Garden, ten weeks: shop, three weeks, A., I.
Shop, M.
Wood Carving, L.

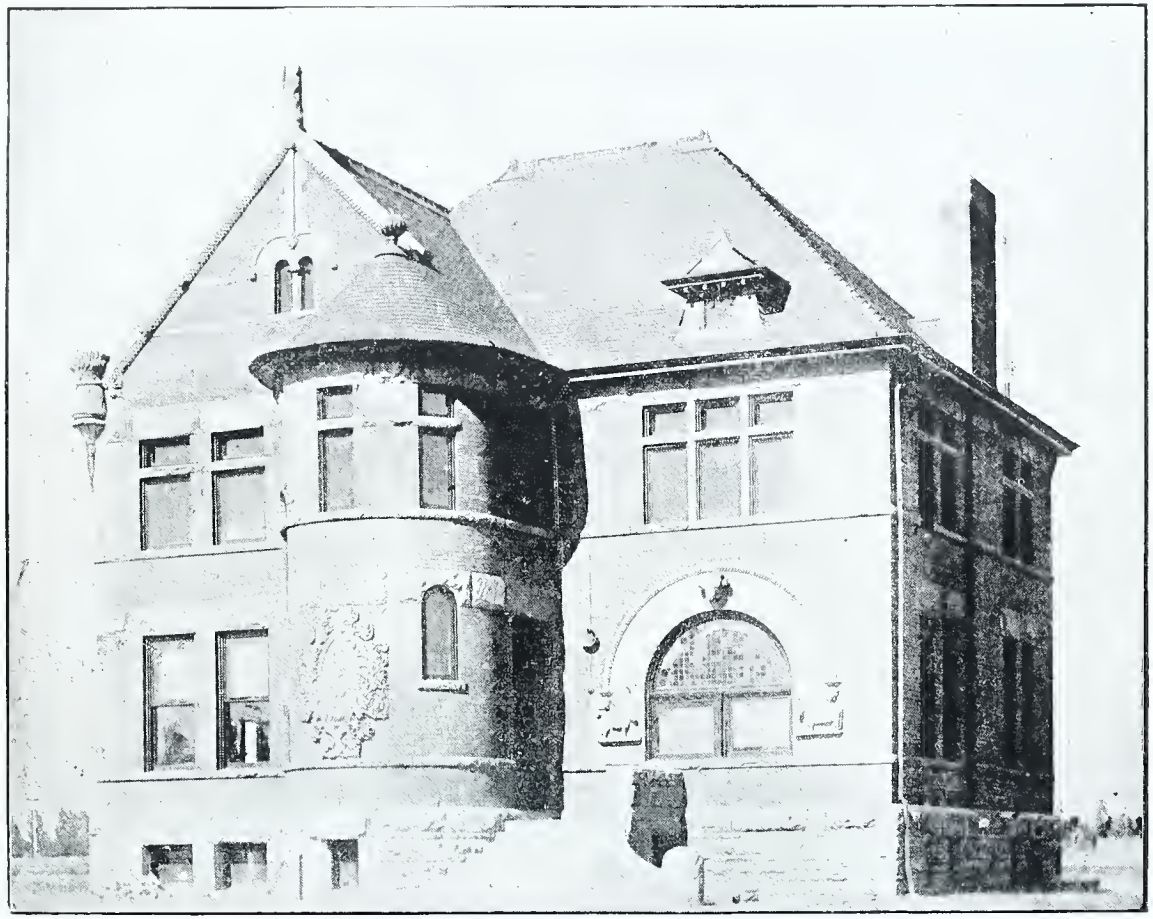
SECOND TERM.

Plane Geometry ..... Wentworth
History ..... Sheldon
Drawing ..... Instrumental
Agriculture, A., I., L. ..... Lectures
Carpentry and Joinery, M. ..... Goss
Labor: Shop, A., I., M.

THIRD TERM.

History ..... Sheldon
Drawing ..... Instrumental
Botany ..... Gray, with Coulter's Flora
Plane Geometry, 1-4; Algebra, 3-4 ..... Wentworth
Labor: { Shop, two weeks: farm, nine weeks, A., I.
Shop, M.
Molding, L.

Military Drill daily. Rhetorical work one hour per week. Readings from American Men of Letters and American Orators one hour per week. Calisthenics two hours per week.



AGRICULTURAL HALL, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

MECHANIC ARTS HALL, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

Sophomore Year.

FIRST TERM.

Physiology ..... Martin
Book-keeping, Double Entry ..... Gay
Rhetoric ..... A. S. Hill
Algebra, 1-4 ; Trigonometry, 3-4 ..... Wentworth
Labor : { Shop, 1-2 ; Physiology, 1-2, A., I., M.
Home Hygiene, 1-2, L.
Physiology, 1-2, L.

SECOND TERM.

Literature ..... Kellogg—Library
Physics ..... Deschanel
Physiology ..... Martin
Drawing, A., L. ..... Instrumental and Free-hand
Solid Geometry, I., M. ..... Wentworth
Descriptive Geometry, I., M. ..... Wentworth
Farm Buildings and Roads, A. ..... Lectures
Labor : Physics.

THIRD TERM.

Literature ..... Kellogg—Library
Physics ..... Deschanel
Surveying, A., I., M. ..... Hodgman
Drawing, L. ..... Free-hand
Ethics, A., L. ..... Lectures
Algebra, I., M. ..... Wentworth
Descriptive Geometry, I., M. ..... Wentworth
Agriculture, A. ..... Lectures
Labor : Physics, 1-2 ; Surveying, 1-2, A., I., M.
Readings in Literature ten hours per week, 1-2, L.

Military Drill daily. Rhetorical work one hour per week. Readings from English Men of Letters one hour per week. Calisthenics two hours per week for ladies.

The Course from this point is separated into :

1. The Agricultural Course.
2. The Mechanical Course.
3. The Irrigation Course.
4. The Ladies' Course.
5. The Chemical Course.

All lead to the degree of Bachelor of Science.

Agricultural Course.

JUNIOR YEAR.

FIRST TERM.

Horticulture ..... Lectures
Chemistry ..... Norton
Physics ..... Deschanel
Landscape Gardening, 1-2 ..... Lectures
Meteorology, 1-2 ..... Lectures
Labor: Horticulture, 2-5; Chemistry, 3-5.

SECOND TERM.

Chemistry ..... Norton
Geology ..... LeConte
Zoology ..... Colton's Manual and Lectures
Zoological Laboratory.
Labor: Chemistry.

THIRD TERM.

Agricultural Chemistry ..... Storer
Entomology ..... Lectures
Geology ..... LeConte
Irrigation Hydraulics ..... Lectures
Labor: Chemistry, 3-5; Entomology, 2-5.

SENIOR YEAR.

FIRST TERM.

Agricultural Chemistry ..... Storer
Agriculture ..... Lectures
Psychology ..... Hill
Logic ..... Gregory
Labor: Chemistry.

SECOND TERM.

Physiological Botany ..... Strasburger
Horticulture ..... Lectures
Agriculture ..... Lectures
Constitution ..... Andrews
Labor: Physiological Botany.

THIRD TERM.

Agriculture ..... Lectures
Political Economy ..... Mill
Recent History ..... Library
Thesis Work.
Labor: Farm, 1-2; Garden, 1-2.

Military Drill daily. Rhetorical work one hour per week throughout the course.

Mechanical Course.

JUNIOR YEAR.

FIRST TERM.

Foundry Practice ..... West
Chemistry ..... Norton
Physics ..... Deschanel
Higher Algebra ..... Wentworth

Labor: Shop, 2-5; Chemistry, 3-5.

SECOND TERM.

Chemistry ..... Norton
Geology ..... LeConte
Analytic Geometry ..... Wentworth
Drawing ..... Instrumental

Labor: Chemistry.

THIRD TERM.

Drawing ..... Instrumental
Calculus ..... Taylor
Elements of Mechanism ..... Stahl and Woods
Work-Shop Appliances ..... Shelley, Rose

Labor: Shop.

SENIOR YEAR.

FIRST TERM.

Drawing ..... Instrumental
Calculus ..... Taylor
Logic ..... Gregory
Psychology ..... Hill

Labor: Shop.

SECOND TERM.

Drawing ..... Instrumental
Strength of Materials ..... Merriman
Transmission of Power ..... Lectures
Steam Engine ..... Holmes
Boilers ..... Wilson

Labor: Shop, 4-5; Testing Materials, 1-5.

THIRD TERM.

Special Chemistry ..... Blair—Winkler and Lunge
Special Machines ..... Lectures
Political Economy ..... Mill

Thesis Work.

Labor: Chemistry.

Military Drill. Rhetorical work one hour per week throughout the course.

Irrigation Course.

JUNIOR YEAR.

FIRST TERM.

Irrigation Engineering.....Lectures—Wilson
Physics.....Deschanel
Higher Algebra.....Wentworth
Horticulture.....Lectures
Labor: Horticulture, 2-5; Engineering, 3-5.

SECOND TERM.

Reservoirs and Dams, 1-2.....Lectures—Merriman
Hydraulic Construction, 1-2.....Lectures
Analytic Geometry.....Wentworth
Geology.....LeConte
Drawing.....Instrumental
Labor: Engineering.

THIRD TERM.

Canal Engineering.....Lectures—Flynn
Agricultural Hydraulics.....Lectures
Calculus.....Taylor
Drawing.....Instrumental
Labor: Engineering.

SENIOR YEAR.

FIRST TERM.

Calculus.....Taylor
Chemistry.....Norton
Logic.....Gregory
Hydrography, 1-2.....Lectures
Meteorology, 1-2.....Lectures
Labor: Engineering, 2-5; Chemistry, 3-5.

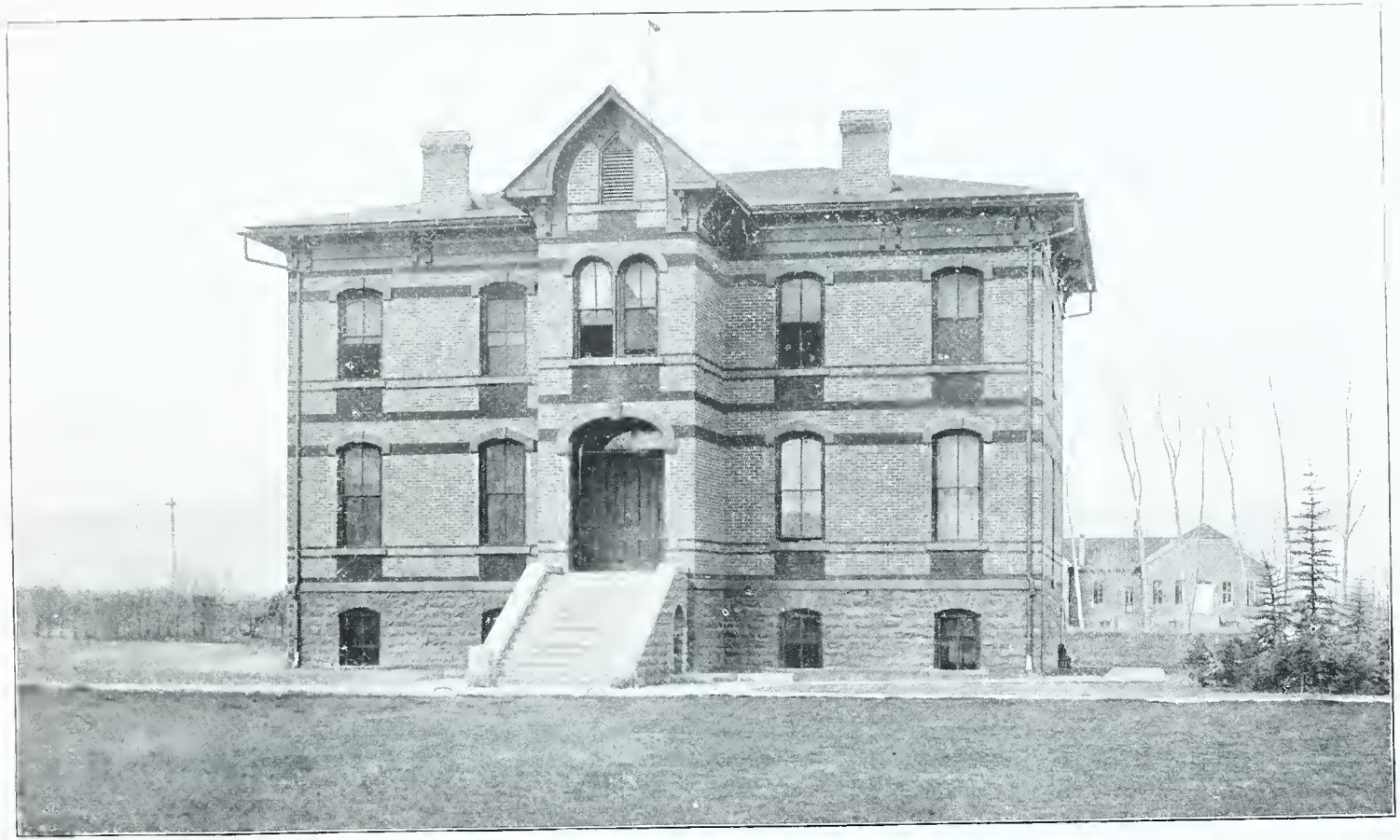
SECOND TERM.

Chemistry.....Norton
Strength of Materials.....Lectures—Merriman
Constitution.....Andrews
Drawing.....Instrumental
Labor: Chemistry, 4-5; Testing of Materials, 1-5.

THIRD TERM.

Hydraulics.....Lectures
Trusses and Bridges.....Burr
Political Economy.....Mill
Thesis Work.
Labor: Engineering.

Military Drill daily. Rhetorical work one hour per week throughout the course.



DORMITORY, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

(Now used by the Department of Physics and Irrigation Engineering.)

Ladies' Course.

JUNIOR YEAR.

FIRST TERM.

Typewriting.....
Chemistry.....Norton
Physics.....Deschanel
Horticulture.....Lectures

Labor: Typewriting, 2-5; Chemistry, 3-5.

SECOND TERM.

Chemistry.....Norton
Geology.....LeConte
Zoology.....Colton's Manual with Lectures
Typewriting.....

Labor: Chemistry.

THIRD TERM.

Chemistry of Common Life.....Johnston
Geology.....LeConte
Recent History of America.....Library
Stenography.....

Labor: Chemistry. Geology.

SENIOR YEAR.

FIRST TERM.

Logic.....Gregory
Psychology.....Mill
Landscape Gardening, 1-2.....Lectures
Meteorology, 1-2.....Lectures
Philosophy of History.....Lectures

Labor: History, ten hours per week, Library.

SECOND TERM.

Physiological Botany.....Lectures
Psychology (Applied).....Hill and Lectures
Constitution.....Andrews
Stenography.....

Labor: Physiological Botany.

THIRD TERM.

Recent History of Europe.....Library
Political Economy.....Mill
Sociology.....Lectures
Thesis Work.

Labor: History, ten hours per week, Library.

Rhetorical work one hour per week throughout the course. Calisthenics two hours per week throughout course.

Chemical Course.

JUNIOR YEAR.

FIRST TERM.

Elementary Chemistry.....Norton
Chemical Physics.....Cooke
Toxicology.....Wormley
Higher Algebra.....Wentworth
Labor: Chemistry.

SECOND TERM.

Elementary Chemistry.....Norton
Agricultural Chemistry.....Storer
Analytic Geometry.....Wentworth
Blowpipe and Mineralogy.....Endlich
Labor: Chemistry.

THIRD TERM.

Organic Chemistry.....Remsen
Agricultural Chemistry.....Storer
Calculus.....Taylor
Chemical Technology.....Wagner
Labor: Chemistry.

SENIOR YEAR.

FIRST TERM.

Volumetric Analysis.....Hart
Psychology.....Mill
Logic.....Gregory
Calculus.....Taylor
Labor: Chemistry.

SECOND TERM.

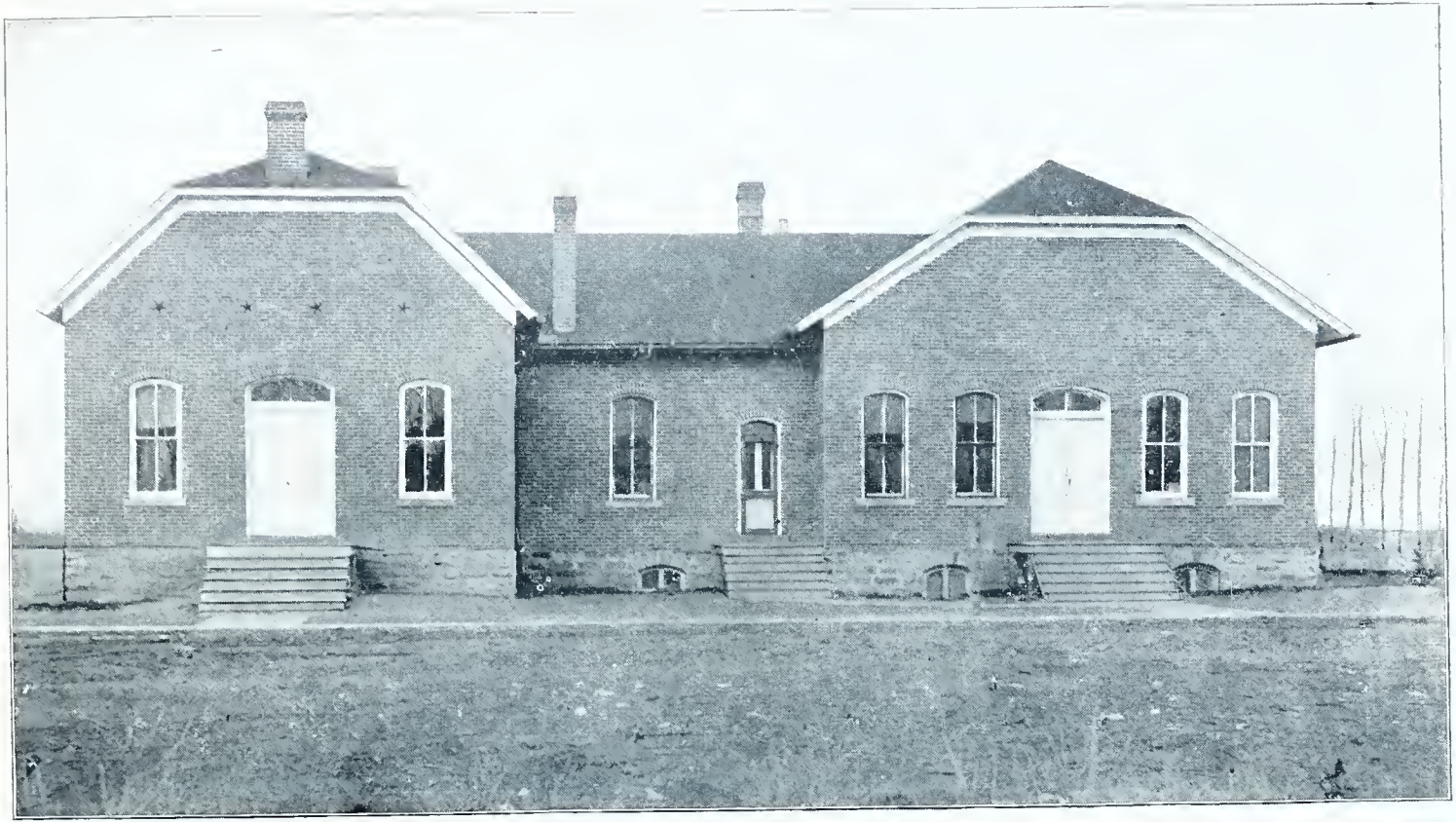
Assaying.....Brown
Geology.....LeConte
Zoology.....Colton's Manual with Lectures
United States Constitution.....Andrews
Labor: Chemistry.

THIRD TERM.

Gas Analysis.....Winkler and Lunge
Geology.....LeConte
Political Economy.....Mill
Thesis Work.
Labor: Chemistry.

Military Drill daily. Rhetorical work one hour per week throughout course.

Students who elect to take the Chemical Course must have first two years with those taking the Mechanical Course, or with those taking the Irrigation Course.



CHEMICAL LABORATORY, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

RECITATION SCHEME—FALL TERM.

TIME.	PREPARATORY.	FRESHMAN.	SOPHOMORE.	JUNIOR.	SENIOR.
7:55 a. m.	General Assembly of Students for Chapel Exercises.				
8:10 a. m.	U. S. History.	Composition and Rhetoric. Algebra.	Rhetoric.	Horticulture. Foundry Practice.	Logic.
9 a. m.	English Analysis.	History. Botany.	Algebra and Plane Trigonometry.	Chemistry. Irrigation Engineering.	Psychology. Chemistry.
9:50 a. m.	Drawing.	Botany. Composition and Rhetoric.	Physiology.	Physics.	Agricultural Chemistry. Calculus. Philosophy of History.
10:40 a. m.	Arithmetic.	Algebra. History.	Book-keeping.	Higher Algebra. Meteorology, 1-2. Landscape Gardening, 1-2. Typewriting	Drawing. Meteorology, 1-2; Agriculture. Hydrography, 1-2; Landscape Gardening, 1-2.
11:30 a. m. to 12:20 p. m.	Calisthenics and Military Drill.				
1:30 p. m. to 3:30 p. m.	Farm, 3-4. Shop, 1-4.	Garden, 3-4. Shop, 1-4. Shop, Wood Carving.	Shop, 1-2. Home Hygiene, 1-2. Physiology, 1-2.	Horticulture, 2-5; Shop, 3-5; Typewriting, 2-5; Chemistry, 3-5. Engineering.	Chemistry. Shop. Engineering, 2-5; Chemistry, 3-5. Historical Reading.

RECITATION SCHEME WINTER TERM.

TIME.	PREPARATORY.	FRESHMAN	SOPHOMORE.	JUNIOR	SENIOR.
7:55 a. m.	General Assembly of Students for Chapel Exercises.				
8.10 a. m.	Drawing.	History.	Solid Geometry. Farm Buildings and Roads. Drawing.	Zoology. Drawing.	Physiological Botany. Drawing.
9 a. m	English Analysis.	Agriculture. Carpentry and Joinery.	Drawing. Literature.	Zoological Laboratory. Typewriting. Analytic Geometry.	Horticulture. Strength of Materials. Stenography.
9:50 a. m.	U. S. History.	Plane Geometry.	Physiology.	Reservoirs and Dams, 1-2; Hydraulic Construction, 1-2. Chemistry.	Agriculture. Transmission of Power. Chemistry. Psychology (applied).
10:40 a. m.	Arithmetic.	Drawing.	Physics.	Geology.	Constitution. Steam Engine.
11:30 a. m. to 12:20 p. m.	Calisthenics and Military Drill				
1:30 p. m.	Shop.	Shop.	Physics.	Chemistry. Engineering.	Physiological Botany. Shop, 4-5; Testing Materials, 1-5. Chemistry, 1-5.
3:30 p. m.	Shop.	Shop.	Descriptive Geometry.	.....	.....

RECITATION SCHEME—SPRING TERM.

TIME.	PREPARATORY.	FRESHMAN.	SOPHOMORE.	JUNIOR.	SENIOR.
7:55 a. m.	General Assembly of Students for Chapel Exercises.				
8:10 a. m.	Civil Government.	Botany. Drawing.	Physics.	Calculus. Entomology. Chemistry of Common Life.	Political Economy.
9:00 a. m.	Word Analysis.	Drawing. Botany.	Agriculture. Literature. Algebra.	Geology. Canal Engineering. Workshop Appliances.	Sociology. Thesis Work. Hydraulics. Special Machines.
9:50 a. m.	Arithmetic.	History.	Surveying. Drawing.	Agricultural Chemistry. Stenography. Drawing.	Agriculture. Thesis Work. Trusses and Bridges.
10:40 a. m.	Drawing.	Geometry and Algebra.	Ethics.	Recent History. Hydraulics. Elements of Mechanism.	Recent History. Special Chemistry. Thesis Work.
11:30 a. m. to 12:20 p. m.	Calisthenics and Military Drill.				
1:30 p. m. to 3:30 p. m.	Shop, 1-6 Garden, 5-6.	Shop, 1-6. Farm, 5-6. Shop. Molding.	Physics, 1-2; Surveying, 1-2. Readings in Literature, 1-2.	Chemistry, 3-5; Entomology, 2-5. Shop. Engineering. Geology, 2-5.	Farm, 1-2; Garden, 1-2. Chemistry. Engineering. Readings in History.
3:30 p. m.	.....	.....	Descriptive Geometry.	.....	.....

Departments of Instruction and Labor.

AGRICULTURE.

By means of intelligent experimental work, conducted on the College Farm and at the Experiment Station, in which student labor is given a prominent place, a very practical training is given.

A greater effort than ever before is being made by the authorities to provide a thorough course of instruction, in the School of Agriculture, designed especially to educate the students for agricultural pursuits and scientific investigations. In addition to the complete course, a brief but thoroughly practical

WINTER COURSE

of lectures has been instituted. This course is valuable to farmers as well as their sons. The lectures continue four weeks and, in addition to those on Agriculture, include a lecture daily on Agricultural Chemistry, Botany, Horticulture, and Entomology. Special lectures are also solicited from experts in certain lines. For those desiring more knowledge in Agriculture and kindred subjects than is offered in the Winter lectures, a

SHORT COURSE IN AGRICULTURE

of two years is provided, with practical and instructive farm and garden labor, two hours daily, or laboratory or experimental work, and military drill during the entire

course. The instruction consists of lectures, principally, sometimes text-book lessons, supplemented by lectures on the elements, history, origin, and development of, and the general principles underlying, Agriculture; breeds of live stock, their adaptation to this country and modifications produced by climate, food, and treatment; the dairy in its many forms, together with the breeds for dairy purposes. Soils, preparation for seeding, harvesting, storing, and marketing—subjects with which, those who desire this course, are more or less well acquainted practically—will be considered but briefly.

THE REGULAR AGRICULTURAL COURSE.

The four-year course begins with the College year and in the Freshman class. Agriculture is taught, beginning with the Winter term and continuing through the year. The instruction consists of the lectures of the Short Course above named, the students of the two classes coming together to receive it.

In the Junior year, Fall term, the instruction in Agriculture begins with lectures on the history of Agriculture, fertilizing, and farm buildings. The breeds of live stock receive attention much of the year.

In the Senior year, first term, there is further instruction in regard to soils, and practical irrigation; and special instruction in the principles of stock-feeding. In the second term, the subjects of drainage, cereals, and cross-fertilization are treated.

In the third term, the subject of improved stock breeding and dairying, with practical work, is very thoroughly treated in a course of lectures and by text-book instruction.

The whole course will be supplemented by the labor on the farm, and laboratory and experimental work, at the times noted in the schedule of exercises.

SHORT COURSE IN AGRICULTURE.

FIRST YEAR.

First term—1. Agriculture. 2. Botany. 3. Zoology. 4. Composition and Rhetoric. Labor, garden.

Second term—1. Agriculture. 2. Book-keeping. 3. Physics (elementary). 4. Drawing. Labor, shop.

Third term—1. Agriculture. 2. Botany. 3. Drawing. 4. Entomology. Labor, farm.

SECOND YEAR.

First term—1. Agriculture. 2. Horticulture. 3. Chemistry. 4. Drawing. Labor, chemical laboratory.

Second term—1. Agriculture. 2. Horticulture. 3. Chemistry. 4. Physiology. Labor, chemical laboratory.

Third term—1. Agriculture. 2. Agricultural Chemistry. 3. Physiology. 4. Irrigation Hydraulics. Labor, chemical laboratory. Military drill throughout the course.

PHYSIOLOGY

is taught during the first and second terms of the Sophomore year, Martin's Human Body being used as a text-book. Aside from the daily recitations, students spend two hours a day, during the last half of the first term, in the laboratory, to study human and comparative osteology and histology, and to dissect anæsthetized animals, for the purpose of making a careful study of the various organs.

The laboratory is well-equipped, possessing, among other things, a fine series of mounted skeletons, an expensive manikin (a life-sized model of the human body so dissected as to show nearly every tissue and organ that can be seen in an actual dissection), enlarged papier mache models of the eye, ear, brain, and other important parts, also compound and dissecting microscopes, microtomes, and dissecting instruments.

HOME HYGIENE.

This subject is taught by means of lectures during the first six weeks of the first term of the Sophomore year in

CLASS IN PHYSIOLOGY, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

MUSEUM, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

the Ladies' Course. Instruction is given in those subjects that have to do with health in the home as, the prevention of disease, micro-organisms and disease, care of the sick, care of the home, care of children, food, clothing, exercise, etc.

ZOOLOGY

is taught in the second term of the Junior year in the Agricultural Course and the Ladies' Course. This branch of natural science is taught by means of lectures and actual demonstrations in the laboratory. Each student is furnished with typical forms of the different branches of the animal kingdom, which he studies carefully, making drawings and taking notes. In this manner, the student acquires a practical knowledge of the structure and classification of animals, that he cannot obtain by a mere study of books.

Microscopes, dissecting tools, and all necessary equipment for laboratory work are furnished free, each student being required to care for his own instruments.

ENTOMOLOGY

is taken in the third term of the Junior year in the Agricultural Course, and is taught by lectures and laboratory work. Each student gets together and classifies a collection of insects representing all the orders, and carries a few species through all their transformations, taking notes and making drawings and descriptions.

Particular attention is given to the economic features of this study. Those insects known to be injurious are given special attention, and the students are made familiar with their habits and natural histories. Students also prepare the principal insecticide substances and apply them for the destruction of insects.

In connection with this department are a good apiary and honey-house, thoroughly equipped with the most mod-

ern appliances, and students so desiring are taught and allowed to put into practice all the manipulations of the apiary.

Students taking this study are required to purchase Packard's Entomology for Beginners.

BOTANY.

The study of Botany begins with the Freshman year. The Fall term is devoted mainly to Structural Botany. The plant as an individual is studied as to its part, or organs—the relation each part bears to the whole—the variations in the parts, and the uses they serve. Roots, branches, buds, leaves, flowers, and fruits are placed in the students' hands, and the technical descriptive terms are learned by applying them directly to the plants.

Gray's Lessons is used as text to supplement the instruction from the plants themselves. A few lectures on classification and the relations of plants to each other are given toward the close of this term.

The Spring term of the same year is devoted to Systematic Botany. Dissecting microscopes and necessary tools are furnished and plants are each day supplied for analysis. Students are taught the application of the principles learned during the first term, so that they may understand the methods of determining the names of plants. The great variety of plants at hand enables the student to become familiar with all the leading natural orders. Written descriptions of the plants analyzed are required. Coulter's Manual of Rocky Mountain Botany is the text-book used.

PHYSIOLOGICAL BOTANY.

In the Winter term of the Senior year, the Agricultural students study vegetable physiology and the minute structure of plants, using as a text-book Strasburger's Practical Botany.

Compound microscopes are supplied and the Botanical laboratory is open to members of the class two hours each afternoon.

An herbarium of native and foreign plants and the green-house furnish material for study.

A portion of this term is devoted to Cryptogamic Botany, special attention being given to rusts, smuts, and mildews, injurious to plants.

The laboratory is well-equipped with books of reference and with all necessary apparatus and reagents.

HORTICULTURE.

Instruction in Horticulture is given by lectures. The first course of thirteen weeks, in the Fall term of the Junior year, deals mainly with methods. Under the general head of Vegetable-gardening, the principal topics considered are—the best soil and situation for a garden; manner of laying out a garden; irrigation of garden crops; rotation of crops; methods of planting and management; composts and commercial fertilizers; care of tools; construction, management, and uses of hot-beds and cold-frames; harvesting, marketing, and storing vegetables.

Brief historical notes, and full cultural directions, are given concerning all of the vegetable plants commonly grown in gardens.

Small fruit culture is next taken up; each kind is considered in detail as to its history, propagation, cultivation, harvesting, marketing, the best varieties, and the diseases to which it is subject.

Then follows a series of lectures upon methods of plant propagation, including a thorough discussion of budding and grafting.

Plants, tools, and other appliances are provided for class-room use in giving practical illustrations of the subject treated.

A portion of this term is devoted to Forestry. Lectures are given on the gathering and preservation of forest-tree seed, the planting of seed, and the care of seedlings; on the value of trees for timber and ornament, for hedges, screens, and shelter belts.

A second course of lectures during the Winter term of the Senior year treats of the theory of Horticulture, and considers in detail the underlying principles of garden practice; lectures are given upon the history of cultivated plants, variation of plants under cultivation, as influenced by climate, latitude, altitude, and general surroundings; cross-fertilization and hybridization. Pomology is then taken up, and the theory and practice of orchard management considered in detail.

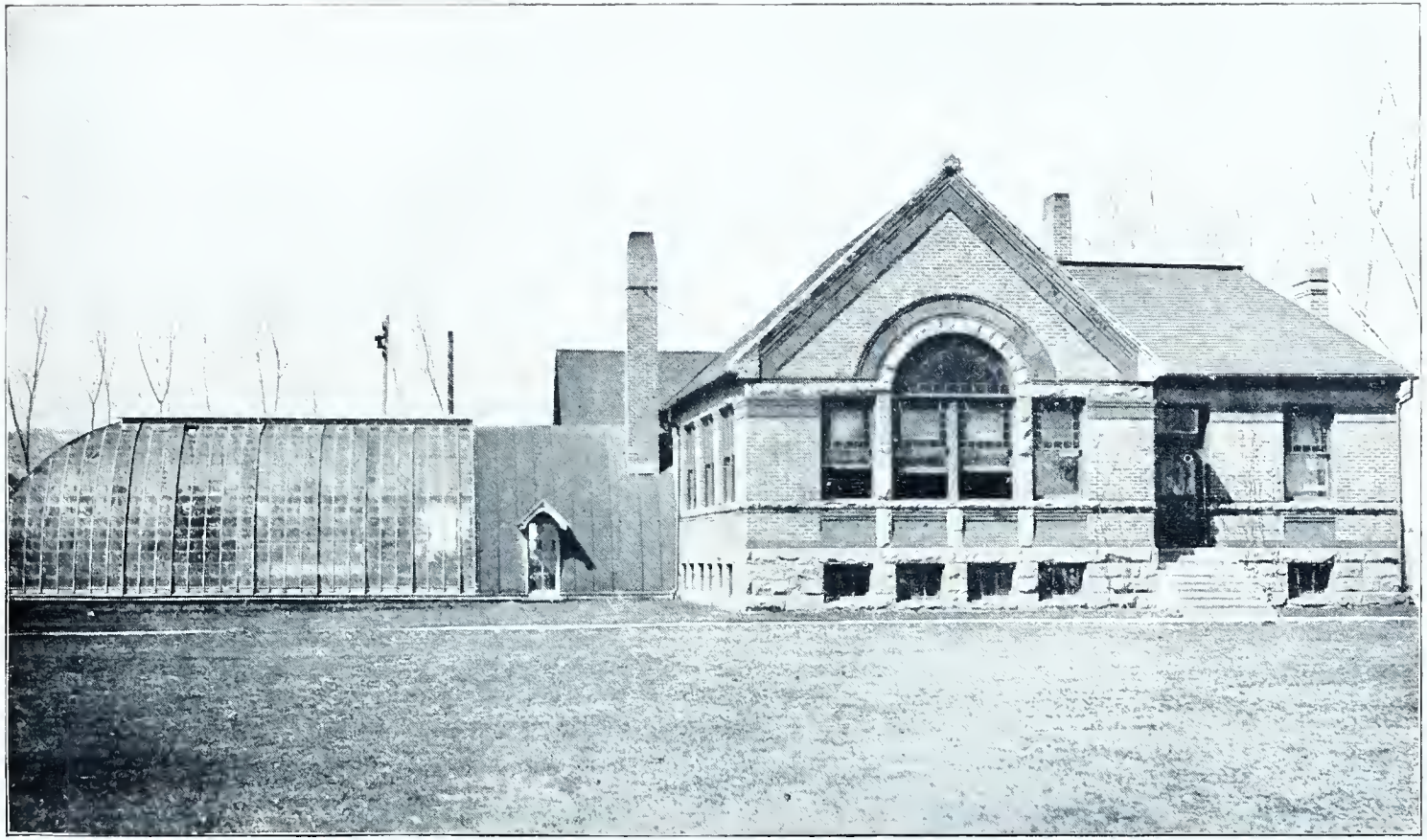
Floriculture is also treated on such topics as the construction, heating, and management of green-houses, the propagation, cultivation, and management of green-house plants for commercial or private purposes.

LANDSCAPE GARDENING.

One-half of the Fall term of the Senior year is allotted to this study. The general principles of the art are taught by lectures and practical instruction given in the selection and laying out of city and country places. The principal topics are, the selection of a place, the location of buildings, drives, and walks, what to plant and how to plant. The works of Downing and Kemp are used as books of reference.

CHEMISTRY.

It is the object of this department to give the student an opportunity to acquire a thorough mastery of the elementary principles of chemical science. To attain this object, theory and practice are made to go hand in hand. In the first term of the Junior year, the class receives a series of lectures, accompanied by text-book work, upon



HORTICULTURAL HALL, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

FORCING HOUSE, HORTICULTURAL DEPARTMENT, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

the general theory of the science, its history and development. In this course of lectures are discussed the subjects of acids, bases and salts, and the principles of chemical philosophy. The natural history, chemical and physical properties of each of the elements are discussed in detail, the whole being illustrated by experiments. While taking this course, the student spends two hours each day in the chemical laboratory, repeating the experiments shown in the class-room, and making others which may be suggested, thus familiarizing him with the various forms of compounds, the marked distinctions between the different classes of salts, the use of chemical nomenclature and the manipulation of apparatus. Practice in the use of the blowpipe accompanies this work, and an insight into determinative mineralogy is thus acquired. The use and application of the spectroscope are also taught. The students in the laboratory, at the end of the first term, are examined in the text-book (O'Brine's Laboratory Guide) and by analysis of *unknown bodies* in the dry way.

In the second term of the Junior year, the Inorganic Chemistry is finished and Organic Chemistry is taken up. The laboratory work continues four-fifths of the term, and the student takes up the tests for the bases and their separation; also, the tests for the acids and their separation. The students are examined at the close of the second term by means of unknown bodies, composed of mixtures of the several groups of bases.

In the third term of the Junior year the class completes Organic Chemistry, with some practice in Chemical Physics and Stoichiometry. In the laboratory, the separation of the bases and acids is reviewed, tests for the poisons are made, their separation from organic mixtures is worked out, and the analysis of organic compounds is carried on.

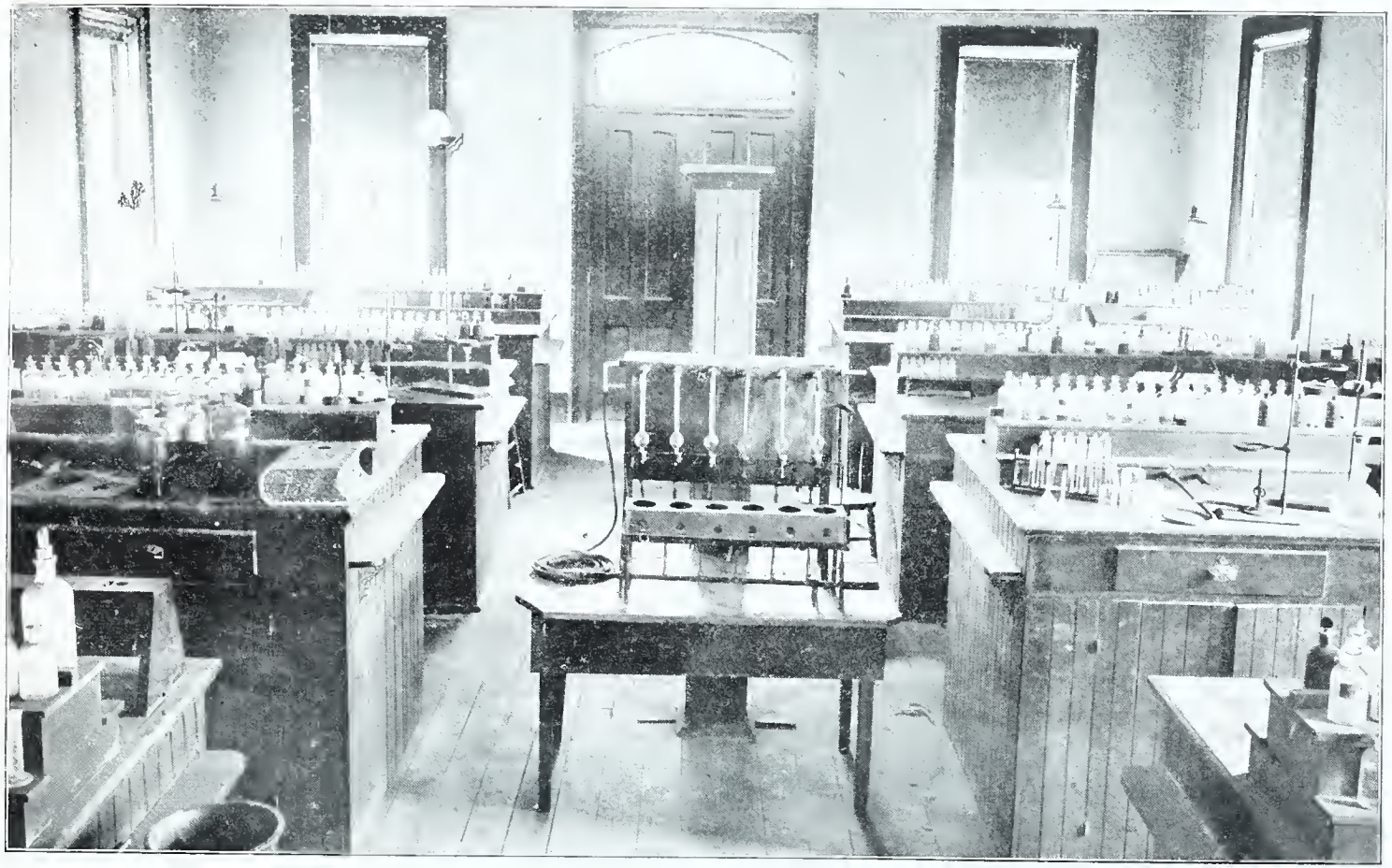
In the Agricultural course, in the second and third terms of the Junior year, the students listen to a course of

lectures upon Agricultural Chemistry, in which are discussed such subjects as the following: Relation of Chemistry to Agriculture, the literature of Agricultural Chemistry, elements of plant growth, their relative abundance and importance, the atmosphere, the soil, fertilizers, etc. Storer's Agriculture, Johnson's "How Crops Grow" and "How Crops Feed" are used as reference books. Laboratory work accompanies the lectures and work in the text-books. The study of quantitative analysis begins in the gravimetric way, and, after some little practice, students will be directed in any line of special work they may desire.

In the third term of the Senior year of the Mechanical course, the students study the chemistry of alloys, iron, steel, and fuel, and in the laboratory they are taught the analysis of these bodies, including furnace gases. Students have the use of all the apparatus described in Winkler and Lunge's "Technical Gas Analysis."

Students who desire it, will have an opportunity to see, in the Station laboratory, the analysis of food, blood, poisons, urine, water, coal, minerals, soils; also, assaying and gas analysis. Keeping in mind the object for which our College is founded, we have so planned our Chemical course as to prepare the student for the general application of Chemistry to the industrial arts, while seeking thoroughly to ground him in the application of science to agriculture. A chemical laboratory, fitted up with modern appliances, balance-room, foul-gas room, and desks for thirty-six students, is ready for the classes.

As a part of quantitative analysis, assaying is taught in the Winter term of the Senior year. The College has a complete outfit to illustrate the crucible and scorification processes. Brown's Manual of Assaying is used as a text-book, and Rickett's and Bodeman and Kerl's are used as reference books. Gas analysis is taught in the Spring term of the Senior year. Technical Gas Analysis,



CHEMICAL LABORATORY, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

STATION LABORATORY, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

by Winkler and Lunge, is used as a text-book. A room, in the basement, has been fitted up with special reference to this work, and all the apparatus described in their work has been obtained for the use of the students. Hempel's Gas Analysis is used as a reference book. Of the simpler forms of gas apparatus, Elliott's and Mackintosh's are also accessible to the students. The late edition of Wagner's Chemical Technology is used in this subject. Remsen's Organic Chemistry is used in Organic Chemistry, and Norton's Chemistry in general Chemistry. Johnson's Chemistry of Common Life is used in the Ladies' Course for the last term of the work. In blow-pipe work, Endlich's Manual of Qualitative Blow-pipe Analysis is used as a text-book. In the analysis of agricultural substances, the method adopted by the Association of Official Agricultural Chemists is used. In Chemical Physics, the works of Cooke, Miller, Tilden, and Pynchon are used as references.

Students have access to the following current chemical literature: *Chemical News*, *Analyst*, *Journal of the Chemical Society*, *Journal fur Landwirthschaft*, *Journal of Analytic Chemistry*, and a complete set of "Fresenius Zeitschrift fur Anaylt. Chemie."; also, the following works of reference: Watt's Dictionary of Chemistry, the works of Roscoe, Schorlemmer, Bloxam, Tidy, Miller, Stricker, Pinney, Fowne, Wagner; in analysis, the works of Fresenius, Wills, Classen, Prescott, Thorpe, Wohler, Cooke's Select Methods, Allen's Organic Analysis, Hart, Sutton, Blythe, etc. A three-horse power water-motor is used to run an exhaust fan to ventilate the laboratory and to do other work.

GEOLOGY.

Recognizing the fact that Chemistry and Geology are the foundations of agricultural science, the subject of Geology receives corresponding attention. The second term of the Junior year, Le Conte's Elements of Geology

is taken up and continued during the year. The students work two hours, three days per week, in the laboratory. Lectures on Economic Geology are also given, William's Manual being the guide. Frequent visits to the mountains and quarries illustrate the practical application of dip, strike, fault, formations, stratifications, and elevations by barometer, thermometer, and level, whenever field work is practicable. At the end of the third term the students are required to identify and describe twenty-five rocks or mineral specimens.

The following works of reference are accessible to the students: Croll, Bischof, Lyell, Dana, Nicholson, Geikie, Van Cotta, Platner, Brush, Elderhorst, and the geological reports of other States. Contributions to this department will be thankfully received and due credit will be given.

HISTORY, LITERATURE, AND LANGUAGE.

HISTORY AND LITERATURE.

No education is well rounded without a fair knowledge of History and English Literature.

Excellent opportunities are furnished for the study of these subjects throughout almost the entire course.

United States History, as studied during the greater part of the Preparatory year, takes up the subject with considerable thoroughness, and includes some work in American Literature.

Throughout the whole of the Freshman year, Sheldon's General History is used as a text-book. The most advanced methods are employed. The student is taught to reason about historical events and is required to consult books of reference.

Kellogg's Literature is begun when the class has reached the subject of English History. Thus each historic period and the authors of that period may be considered together. The class-work is supplemented by lectures.

CLASS IN HISTORY, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

During the last two terms of the Sophomore year, members of the Ladies' Course engage in a more extended study of English and American Literature, including critical readings from selected authors, and special attention to the writings of the five greatest English poets. Every effort is made to promote a taste for the best literature.

During the last term of the Junior year, the Recent History of America is studied by members of the Ladies' Course.

In the Senior year, one term is devoted to the Philosophy of History, and includes such subjects as—our historical resources; laws governing human actions; influence of physical laws over society and human character; influence of religion, literature, and government; development of historical literature; and causes of progress in civilization.

One term of the Senior year is devoted to study of the Recent History of Europe, and eight hours a week are given, by the young ladies, to special reading and investigation in the historical subjects which are pursued during two terms of the Senior year.

A valuable collection of photographs belongs to this department, and adds greatly to the interest of its historical work.

The College Library also affords substantial help. Its shelves are well filled with standard literature and with the works of the best historians.

GERMAN.

German is studied during the Junior and Senior years. The great increase of the German population in America during the last thirty years has made a practical knowledge of the German language a business commodity, as well as an elegant accomplishment. A course of two years in German is not sufficient to give a mastery of the language, but the limited time of study is occupied in giv-

ing, as far as possible, power to converse in every-day life. The recitations are conducted in the language studied, and much stress is placed on the ability to converse, as the most certain way to read and use German effectively. It is thought that the study of some language besides our own is of great assistance to the student as a means of mental growth. During the Junior year, Worman's First and Second German books are used, and Andersen's Selected Fairy Tales is used as a basis for conversation. During the last year, the time is equally divided between technical and literary German. A play from Schiller and a selection from Faust are read, with practice in reading at sight, and the study of some German scientific work is pursued. The German periodical, *Die Gartenlaube*, is placed in the library for the benefit of those students who are studying German.

ENGLISH AND STENOGRAPHY.

ENGLISH.

The study of English Analysis is pursued during the Fall and Winter terms of the Preparatory course, followed by Word Analysis during the Spring term.

Composition is taught throughout the Preparatory year, the subjects of punctuation, capitalization, structure, and arrangement of sentences, and the fundamental principles of style receiving special attention.

During the Fall term of the Freshman year, the subject of Composition and Rhetoric is continued, with Lockwood's Lessons in English for a text-book. It is the object of this work to enable the student to acquire skill in the logical arrangement of his thoughts, and to express them in a clear and effective manner.

Advanced work in Rhetoric is required of the Sophomore class during the Winter term. The laws of mind

and language as related to effected discourse, is a subject which receives special consideration.

Composition writing—essays, orations, etc.,—forms an important feature of the entire course in English.

STENOGRAPHY.

Stenography and Typewriting occupy a prominent place in the Ladies' Course.

The object of the work in these branches is to impress upon the mind of the student the importance of a knowledge of the English language and a correct use of the same in business life, as well as to enable him to become an efficient stenographer and typewriter.

A practical course in book-keeping is given in the Fall term of the Sophomore year.

MATHEMATICS.

The purpose of the instruction offered by this Department is two-fold: First, to give the student clear and exact ideas of magnitudes and their measurement, the principles underlying the methods used, and the general unity pervading the mathematical sciences, or such of them as he has time to become acquainted with; second, to give him such skill in computation as to enable him to handle easily and satisfactorily the practical problems he is likely to encounter in his after life.

The subjects offered are as follows:

ARITHMETIC

is taught the students of the Preparatory class. The year's work is designed to give a thorough review of the principles underlying the fundamental operations, and to give skill in the application of these to the various problems of business arithmetic.

ALGEBRA

is begun in the first term of the Freshman year. The first term's work is designed to give the student as clear

ideas as possible of the extensions introdueed into the fundamental operations of arithmetic by the notion of two sorts of quantities directly opposed in character, and of the eoneiseness obtained by the use of literal notation; and to give him sufficient skill in the fundamental operations of Algebra to enable him to solve intelligently simple equations involving one unknown number. Subsequent work aequaints him with the solution of simple equations of several unknown numbers, with involution, evolution, radicals, quadratie equations, and as mueh more as may be possible in the time allowed to the subjeet.

GEOMETRY

is taken up as soon as the student is sufficiently acquainted with algebraie methods to apply them intelligently to the computations of this subject. In the two terms allotted to the study it is designed to give the student thorough practice in formal proof by the syllogistie method, to show him the dependence of the entire subjeet upon the few axioms and elementary eoneepts derived direetly from experienee, and to give him thorough praetice in the mensuration of geometric magnitudes. So far as the time and ability of the student will permit, he is practiced upon original exercises.

TRIGONOMETRY

is taught in the first part of the Sophomore year. In the time allotted to this branch, the student is given elear ideas of the trigonometrieal eoncepts, shown their connection, and given eonsiderable praetice in the practieal applieations of this braneh of Mathematies.

DESCRIPTIVE GEOMTRRY

is taught to those students electing the two courses in Engineering. The seeond and third terms of the Sophomore year are devoted to this subjeet. The principles of parallel

and central projection, of development, etc., are discussed and illustrated in the solution of a great variety of problems, and many of these are accurately worked out on the draughting-board by each student.

From the wide application of Mathematics in all branches of Engineering, those students electing either of the courses having to do with Engineering, pursue the study of Mathematics throughout the entire course, with the exception of the last two terms of the Senior year.

The first term of the Junior year is devoted to a brief review of quadratics and radicals, and to the study of the principal algebraic methods usually denoted by the name Higher Algebra. Among the subjects considered are: Series of various sorts; Mathematical Induction and some of its applications, such as the demonstration of the Binomial Formula; the method of approximating to the value of a continued fraction, etc.; the Theory of Equations; and various methods of solution of equations of the third and higher degrees.

The second term of the Junior year is devoted to the study of Analytic Geometry. The student is made acquainted with the method of co-ordinates, and the connection between algebraic and geometric forms. The fundamental properties of the conic sections are developed, and as much more of the subject as the time permits.

The last term of the Junior and the first term of the Senior years are devoted to the study of Differential and Integral Calculus. Taylor's Calculus is used as a text-book, and the study is pursued substantially as the subject is there developed. The notion of limits is, however, made the logical basis upon which the subject is developed.

The department is provided with a set of Schroeder models from Darmstadt, for purposes of illustration in the study of Solid Geometry, and with models of warped surfaces, etc. The collection is being added to from time

to time. The making of a collection of drawings for use in the study of curves and curve-tracing is under way.

PRACTICAL MECHANICS.

This department has for its object a systematic and progressive education in the use of tools and materials, combined with as much theoretical knowledge as may be deemed necessary to explain the principles involved. It does not teach special trades, or manufacture salable articles; to do so would require that the student be kept on the kind of work that he could do best, and thus prevent him from acquiring broad and liberal ideas of other methods. So, without teaching any complete trade, the mechanical principles of many are gained. This does not necessarily mean that the student becomes sufficiently expert to compete with the skilled mechanic, but that a knowledge of *how* a tool or machine should be used, and the *manner of laying out work* for it, are thoroughly taught.

Should circumstances be such as to cause the student to enter manufacturing, his ideas have been broadened by this training, and he will more readily grasp anything new that may come up in his business, or, should he take up farming, he will with greater ease be able to understand the mechanical principles and workings of his machinery, and know how to keep it and his buildings in proper repair.

The shop instruction is divided into courses as follows, and in each course will be given, in connection with the work, an explanation of the construction of each tool and its manner of acting on the material, the methods of determining how to select materials best suited to different kinds of work, the manner of laying out work, cutting speed of tools, etc.:

COURSE OF LABOR.

Bench work in wood	13 weeks
Wood turning	12 "
Pattern making	12 "
Molding and casting	12 "
Iron and steel forging	13 "
Machine work in metals	12 "
Vise work in metals	12 "

BENCH WORK IN WOOD.

This course consists of exercises with the different wood-working bench tools, so arranged in a graded series as to embraee the manipulation of the tools in their various applications.

First—The use of planes in joining, smoothing and getting the pieee out of wind, lining off and the use of saws in cutting across and with the grain, and keeping to line.

Then follow exereises in making a halved splice, splayed splice, keyed splice, open dovetail mortise and tenon joint, mortise and tenon joint, open dovetail joint, blind dovetail joint, lap joint, dowel joint, small newel post and hand-worked rail, panel door, roof truss, box, carpenter's trestle.

MACHINE WORK IN WOOD.

In connection with this course, with the use of tools, will be given the most rapid and economical method of selecting and preparing the wood for the machine. There will be given examples of straight turning; cutting in and squaring off; concave, convex, and compound curves; handles for ehisels and other tools; examples in chuek work in separate and combined pieces; how to turn a ball.

PATTERN MAKING AND FOUNDRY WORK.

After becoming familiar with bench and machine work in wood, an application of both is made, by con-

structing patterns with due regard to shrinkage, draft, and the best method of constructing the pattern so that it causes the least amount of trouble in the foundry. There will be given examples of plain work; core work; pulley work; pipe work; gear work; core boxes, their use and construction.

After the patterns and core boxes have been constructed, they are taken to the foundry-room by the students, where molds and cores are made, and castings are made in iron or brass.

In the foundry the students are taught how to charge and manage the cupola, each student pouring for himself the hot metal for the molds he has made.

The management of the brass furnace and core oven is also taught.

MACHINE WORK IN METAL.

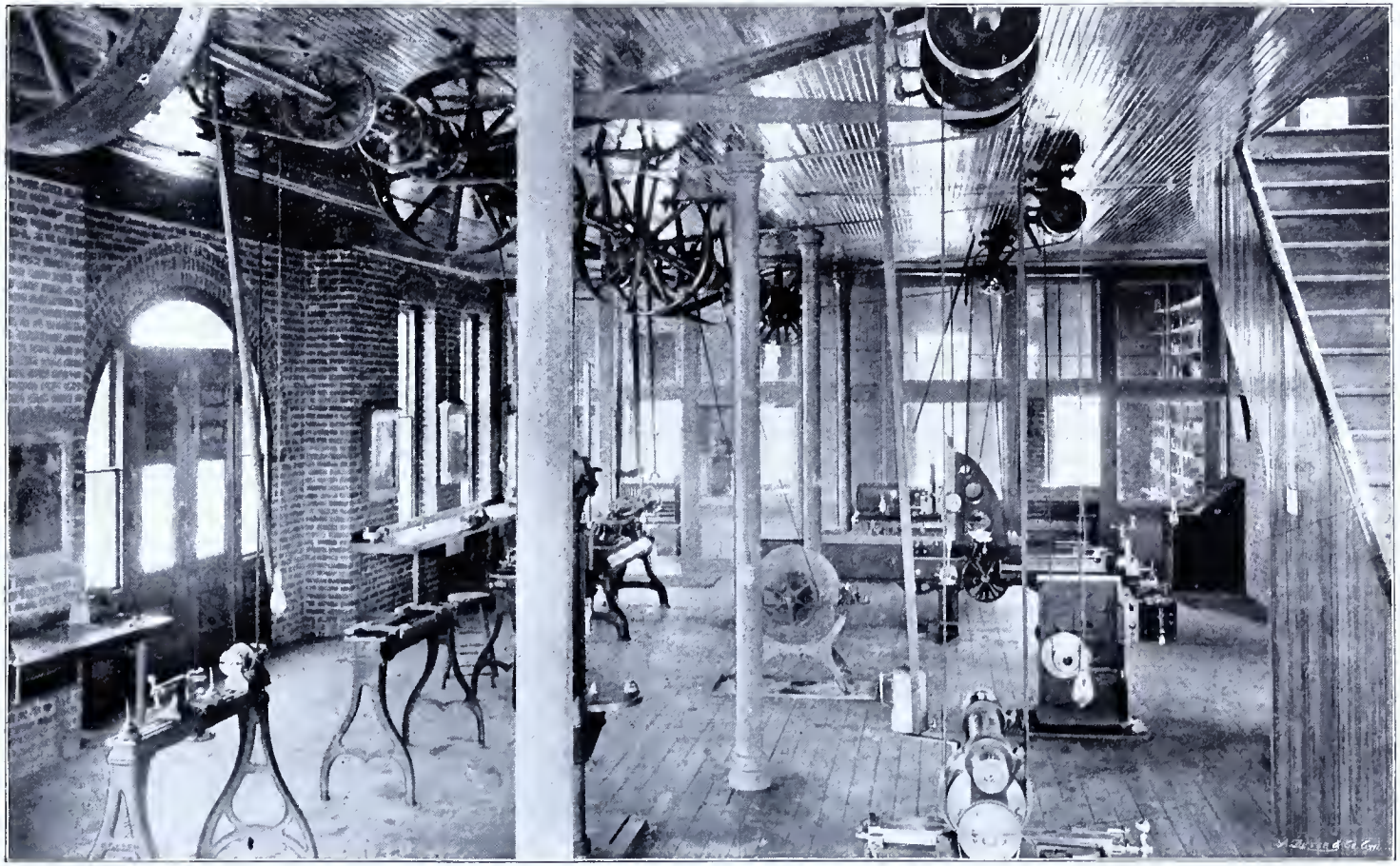
The care and management of the tools, their construction, etc.

Cutting speed of tools and proper angle of cutting edge for different purposes and different metals. Centering and straightening work; straight turning and squaring; boring; making and fitting joints; chuck work; screw cutting, inside and outside; drilling, tapping, and reaming; boring with boring-bar and use of center rest; polishing and finishing; hand-tool work.

DRAWING.

Free-hand copy and dictation; free-hand model and object drawing; light and shade; geometric problems; orthographic and isometric projections and projection of shadows; development and intersection of surfaces; wood carving, diaper, incised and relief.

Persons having parts of machines, patterns, small models, or working drawings, may, if they choose, donate the same to the department, and thereby will confer a



MACHINE ROOM, MECHANICAL DEPARTMENT, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

WOOD-WORKING ROOM, MECHANICAL DEPARTMENT, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

MILITARY COMPANIES, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

great favor upon the College, and especially upon the department.

MILITARY SCIENCE.

For instruction in Military Tactics, the students are formed into companies. The system of instruction, being that in use in the United States Army, is calculated to form the habit of prompt obedience, foster the natural martial instinct, and prepare the students, should necessity arise, to organize a company or battalion of our National militia.

The drill includes the school of the soldier, company and battalion, in Infantry Tactics, supplemented by lectures on the art and science of war.

Instruction in Artillery embraces such portions of the United States drill regulations as pertain to the formation of detachments, manual of the piece, mechanical maneuvers, aiming drill, etc. For use in drill, the department has two three-inch rifled field pieces, from the Rock Island Arsenal, and one hundred and fifty cadet rifles, with accoutrements.

Military drill is required of each male student, unless excused for physical disability or by special vote of the Faculty for good and satisfactory reasons. Each cadet is required to purchase a copy of the standard United States Infantry Tactics, for study and reference. He is also to provide himself with a uniform, modeled somewhat after the uniform of the regular army. It is neat and durable, consists of blouse, pantaloons, cap, and gloves, and costs about twenty dollars.

In the Fall and Spring terms, a period of forty-five minutes daily is devoted to outdoor maneuvers. During the winter, the new armory is used, and a portion of the time is devoted to recitations in tactics and to lectures. When possible, an encampment will be held at the close

of the Spring term for practical instruction in guard and field duty.

PHYSICS.

Instruction in Physics is given by text-book, supplemented by lectures and ouside reading where necessary. The study continues for three terms in the Sophomore and Junior years, and takes up the important sciences of Mechanics, Heat, Light, Sound, and Electricity, especial attention being given to the latter in view of its modern applications. In connection with the class-room work, is carried on a course in laboratory work, lasting for four and one-half months, two hours daily. This course is intended to give the student training by dealing personally with the phenomena studied in the class-room; learning methods of experimentation; reducing observations; and determining some of the physical constants.

The department possesses a good collection of working apparatus, including copies of the official standards of length, weight, mass, and electricity. By access to the principal works of reference, the student has the opportunity to make the course a profitable one.

METEOROLOGY.

A six weeks' course of lectures is given to the members of the Senior class in the Fall term. The course includes a discussion of the means of taking observations; methods of exposure and precautions for taking correct observations; the laws of storms; barometry; the characteristics of climate; influence of the various elements upon agriculture; the study of storm movements from the weather charts, etc. The collection of records at the College, the self-recording meteorological instruments, and a series of current weather-charts, give abundant means for illustrating the course.

SURVEYING.

In surveying, in the last term of the Sophomore year, are taught the theory, use, and adjustments of the instruments used in surveying; the methods governing the United States surveys; the location of lost corners; leveling; field work; and mapping. For one-half the term the class has practical work in the field in the use of instruments and the methods of work. There is also given some elementary knowledge of the measurement of water and the laws governing its flow, such as is useful to every citizen of an irrigated country and is expected of every surveyor.

AGRICULTURAL HYDRAULICS.

This course is intended to include a discussion of the general principles of irrigation as practiced in this and other countries; the different methods applied to cultivated and grass crops; the laying out of grounds for irrigation, canals, flumes, reservoirs, etc.

The course is a general one, covering the methods and principles of irrigation, and is useful to those directly connected with agricultural work.

The course as given in the second year of the short course in Agriculture, and in the Winter course, will be essentially the same, with such modifications as may be necessary because of the special purpose of the course and the preparation of the students entering it.

IRRIGATION ENGINEERING.

Those who desire to fit themselves for water commissioners, superintendents, canal superintendents, or who may desire to secure a basis for work as Irrigation Engineers, may enter the course of Irrigation Engineering in the last two years of the College course. It is the object of the course to give the student as thorough ground-work as circumstances will allow in the theoretical and practical

knowledge of hydraulics, and of engineering as applicable to the special circumstances of irrigation. The special instruction in Civil and Irrigation Engineering extends through the Junior and Senior years, and covers by a course of instruction, principally in lectures, the principles of ditch and canal engineering; reservoir and reservoir construction; fluming; canal structures, as headgates, drops, siphons, etc.; theoretical and practical hydraulics; bridge building; trusses, etc. The whole course is accompanied with field work sufficient in amount to make the student familiar with the instruments and their use. Many of the students do practical work in the surveying of reservoirs, canal lines, gauging of streams, and other similiar work. Where this work is approved by the Professor of Engineering, it is accepted in place of assigned exercises.

The department has accessible in its own collection, and that of the Professor of Engineering, photographs and plans of irrigation structures of this and other countries. In the present condition of Irrigation Engineering, and the lack of suitable text-books, the collection is especially useful.

There is also accessible to the students one of the most complete collections in the United States of works on Irrigation and Irrigation Engineering, covering American, French, Italian, Egyptian, Spanish, and Australian practice.

Besides the engineering instruments, the department possesses current meters of various patterns, water registers, means for measuring the discharge over weirs and through openings of some size, water motors, etc.

STRENGTH OF MATERIALS.

One term is given to the study of the Strength of Materials, including the theoretical and experimental

CLASS ROOM, PHYSICS AND ENGINEERING, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

SENIOR CLASS, EXERCISE IN GAUGING STREAMS, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

study of the materials used in engineering. The department has a machine for the testing of cements, and a large testing-machine whose capacity is 50,000 pounds, which are used in connection with this course.

ORATORY.

Oratory has been defined as the "Art of influencing conduct with the truth sent home by all the resources of the living man."

The study of the Art of Expression is followed in some form throughout the College course. A healthful interest in the subject has been manifested by all the students.

Our public institutions, our form of popular government, great questions of moral and political moment, the almost boundless possibilities within the grasp of individual effort, all tend to increase and intensify the interest in, and to emphasize the importance of, this much-needed branch of education.

No one method will prevail.

Eclecticism—adopting the best of the four prevailing schools of thought in this art—is the plan of work.

The Imitative School.—Only as far as the fundamentals may be safely copied, furnishes the student ideals.

The Speculative School.—The Delsarte methods are followed in the young ladies' classes, in particular, and by all students making a special study of gesture, the aim being to give a thorough knowledge of the functions of the various organs and parts of the body in Expression, and, also, to develop conscious powers (which will, with sufficient practice, become automatic or manifestive, natural in results) in the use of these parts; in short, to bring about that perfect co-ordination of mind and body so seldom seen, yet so much to be desired in public speech.

The Impulsive School.—After thorough and exhaustive preparation of theme.

The Mechanical School.—So far as may be consistent in giving the student an understanding of the uses of the voice and the basic principles of pantomime and gesture. (Nine laws of gesture, etc.)

Very few text-books are required in this branch, as mimeographic copies of the best selections of English prose and verse are furnished the students. This gives a much broader range and scope to the study, and adds an interest to the work not otherwise attained.

A new departure for next year will be extensive work in extemporaneous speech, and its encouragement in the Literary Societies.

Practical rhetorical work will be given by the students before large audiences every Friday evening. These entertainments are becoming quite popular and tend to encourage the students to faithful work.

PHYSICAL CULTURE

is a part of the work required of all lady students. Much interest has been aroused in the young ladies' classes, and much has been accomplished in grace in movement and ease of bearing, promptness, precision, and strength and vigor.

Next year the plan of measurements now in practice in the very best colleges will be introduced.

Special physical exercises will be marked out as the individual needs of each student may require, and results will be closely watched.

The College is now better equipped for the study of the Art of Expression than ever before.

A large number of illustrations have been collected for the purpose of giving the students the advantage of a series of lectures on the Art of Oratory.

PSYCHOLOGY.

Hill's "Elements of Psychology" is the text-book in use.

The subject is taught principally by recitations, discussions, and lectures. Much oral work is done in connection with recitations based upon the text. Supplementary reading along the lines of recent investigations is encouraged. Contributions to the science, found on the pages of the best periodicals, supplement the text-book statements. The lives and writings of representative thinkers in the domain of metaphysics afford interesting topics for much oral instruction and library investigation. Something is done to point out the sources whence a knowledge of the history of psychology can be obtained. The relations of the subject to the work of the teacher are pointed out and made themes for study and discussion.

LOGIC.

This study is taught by recitations, discussions, and original exercises. Careful consideration is given to the principles of deductive reasoning. The syllogism is analyzed. The principles and methods underlying scientific investigation are made subjects of study, and the basis of class discussion and essay work. Practical application of what the student learns in the study of Logic is made in testing the validity of arguments and detecting fallacious reasoning.

The history of the science is considered and something learned of the writers whose works thereon have recognized merit. Gregory's "Practical Logic" is the text-book used.

POLITICAL ECONOMY.

The text-book in use is Mill's "Principles of Political Economy." Access is had to other standard works, such as Walker's "Science of Wealth," Bowen's "American Political Economy," Perry's "Elements of Political Economy," and Gregory's "Political Economy."

The important questions with which the subject deals are treated without attempt to uphold any narrow, one-sided view. Economic questions of particular importance to the people of the United States are given special prominence in the recitations, discussions, and lectures. These are considered from a historic and an impartial standpoint.

CIVIL GOVERNMENT.

The study of the Constitution of the United States, and that of the State of Colorado, is an important preparation for the duties of citizenship. An elementary text-book is used by the students in the Preparatory class. Later in the College course, a more thorough consideration of the subject is provided for.

PUBLIC RHETORICALS.

Each student enrolled has at least one public rhetorical exercise each College term, unless excused by Faculty vote. These exercises consist of declamations and recitations for the younger classes, and original exercises for the advanced students. The importance of these exercises to the student can scarcely be over-estimated, as every one should have a training which will enable him to present his views upon any question in public in an intelligent and a pleasing manner.

DEGREES.

Upon those who complete the work of any one of the five courses in a satisfactory manner, the State Board of Agriculture, upon recommendation of the Faculty of Instruction, confers the degree of Bachelor of Science.

The degree of Master of Science will be conferred upon all graduates of the College who pursue thoroughly some line of work after graduation, and who submit an acceptable thesis.

THE STATE AGRICULTURAL EXPERIMENT STATION.

The Central Station is located at the College, Fort Collins, Colorado, Larimer County. Five Sub-Stations are provided for, three of which are in operation and doing satisfactory work. They are the San Luis Valley Station, at Monte Vista, Rio Grande County; the Arkansas Valley Station, at Rocky Ford, Otero County; and the Divide Station, at Table Rock, El Paso County. The fourth, to be in Delta County, and the fifth, to be in Cheyenne County, have not yet been put in operation.

This department was created in acceptance of the conditions of the Hatch Act, and the work has been arranged in conformity with its provisions.

Bulletins are issued quarterly, or oftener, and reports annually, which are distributed to those who request them as long as the editions last. Address the Director, Fort Collins.

In connection with this work, the Secretary of the State Board annually distributes to applicants, seeds of such varieties as he may obtain from the Experiment Station or elsewhere. All cannot be supplied, but such seeds as we have will be sent where, in our judgment, they will do the most good. The only compensation asked or expected is a careful report of results, with notations on altitude and irrigation, kind and condition of soil, time of planting, and mode of cultivation.

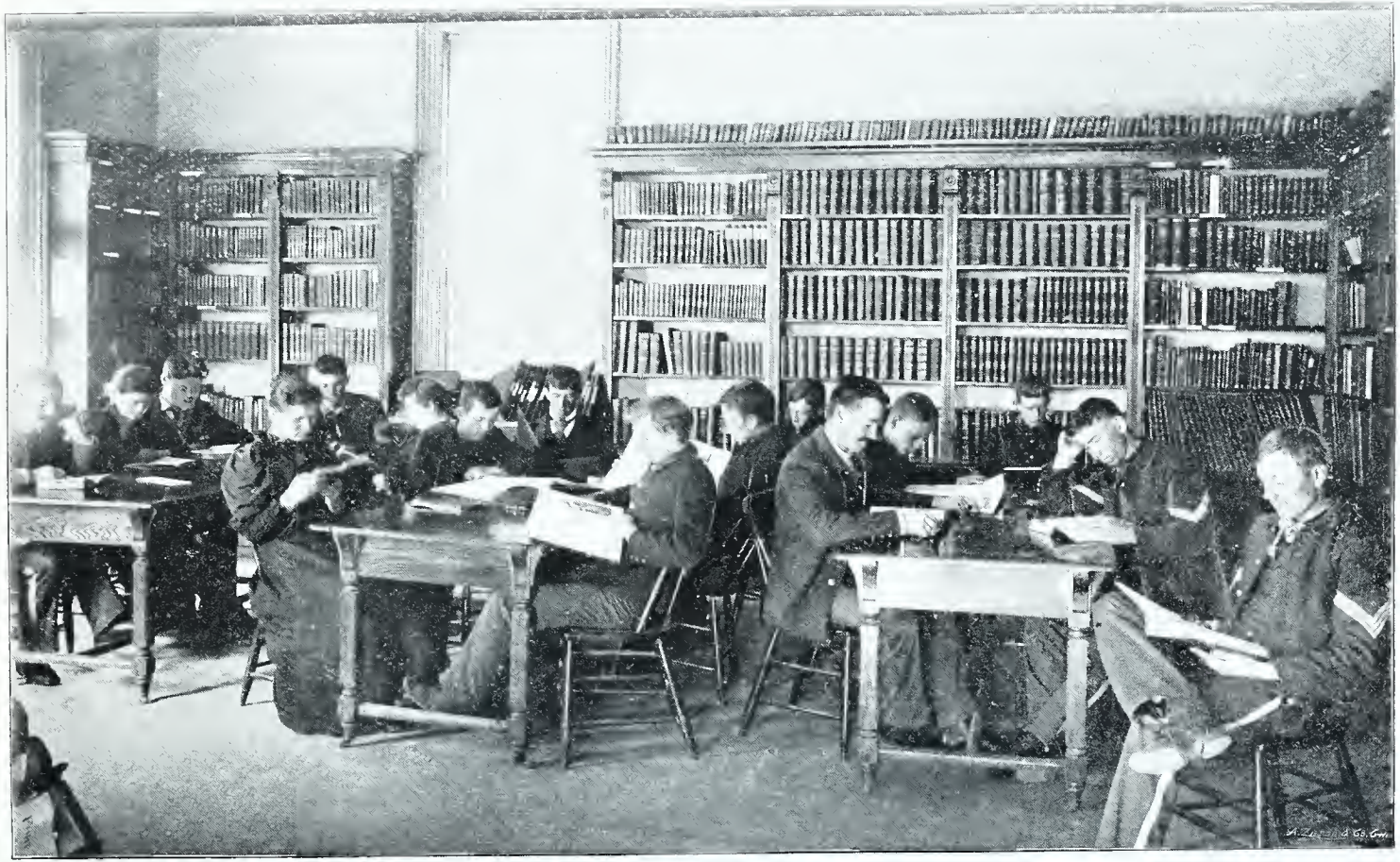
THE LIBRARY.

The College Library was founded in 1878 by donations from members of the Faculty and interested citizens, aided by a small purchasing fund derived from the one-fifth mill tax. From this small beginning it has steadily grown in size, and now contains 4,172 bound volumes, and 6,880 pamphlets.

All the books have been selected with great care. The Library contains choice and valuable works on Agriculture; Irrigation, principally by English, French, and Italian authors; Mathematics; Physics; Chemistry; Geology; Botany and Horticulture; Physiology; Zoology and Entomology; Mechanics and Engineering; Political Economy; Science of Education; Military Science; General History; English and American Literature; Translations of the Classics; Biography; Travels; etc., etc., etc.

On the shelves are found bound volumes of the following-named periodicals:

Appleton's Journal.
Atlantic Monthly.
American Naturalist.
American Journal of Science.
American Agriculturist.
Agricultural Science.
American Journal of Forestry.
American Machinist.
Anthony's Photographic Bulletin.
American Meteorological Journal.
American Bee Journal.
American Garden.
American Architect.
Bulletin of the Torry Botanical Club.
Botanical Gazette.
Breeders' Gazette.
Cottage Gardener.
Canadian Entomologist.
Chemical News.
Country Gentleman.
Century Magazine.
Contemporary Review.
Eclectic Magazine.
Educational Review.
Electrical World.
Engineering News.
Eelectic Engineering Magazine.
Farmers' Advocate.
Gardeners' Chronicle.
Gardeners' Monthly.
Garden and Forest.
Harper's Magazine.
Journal of Chemical Medicine and Veterinary Surgery.
Journal of the Franklin Institute.
Journal of the Association of the Engineering Societies.
Journal of Science and Arts.
Littell's Living Age.
Nature.
North American Review.
National Live Stock Journal.
Microscopical Journal.
Magazine of Horticulture.
Magazine of Western History.
Mining Industry and Tradesman.
Popular Science Monthly.
Princeton Review.
Publishers' Weekly.
Public Opinion.
Scribner's Magazine.
Scientific Farmer.
Scientific American and Supplement.
The Microscope.
The Horticulturist.
The Forum.
Wallace's Monthly.
Zeitschrift fur Analytische Chemie.



LIBRARY READING ROOM, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

Current numbers of the following-named newspapers and periodicals can be found in the Library reading-room:

American Architect.
American Grange Bulletin.
American Machinist.
American Agriculturist.
American Garden.
American Investment.
American Naturalist.
American Meteorological Journal.
American Microscopical Journal.
American Journal of Science.
Agricultural Science.
Art Amateur.
Botanical Gazette.
Board of Health Bulletin.
Bee Journal.
Books.
Brighton Register.
Breeders' Gazette.
Colorado Farmer.
Colorado Index.
Country Gentleman.
Chemical News.
Century Magazine.
Cosmopolitan.
Contemporary Review.
Canadian Entomologist.
Die Gartenlaube.
Electrical World.
Engineering News.
Fort Collins Courier.
Fort Collins Express.
Field and Farm.
Farm and Home.
Forum.
Garden and Forest.
Gardeners' Chronicle.
Greeley Tribune.
Greeley Sun.
Grand Valley Star.
Good Health.
Good Housekeeping.
Harper's Magazine.
Harper's Weekly.
Hoard's Dairyman.
Journal of Education.
Journal of the Franklin Institute.
Journal of the Association of the Engineering Societies.
Journal of the Chemical Society.
Journal fur Londwirtschaft.
Laws of Life.
Loveland Reporter.
Live Stock Journal.
Massachusetts Plowman.
Microscope.
Nature.
North American Review.
Naturalist's Monthly Bulletin.
Orange Judd Farmer.
Pacific Rural Press.
Public Opinion.
Printer's Ink.
Popular Science Monthly.
Pharmaceutical Era.
Rural New Yorker.
Scientific American and Supplement.
Scribner's Magazine.
The Industrialist.
The Statesman.
The Ranch.
The Voice.
The Dakota Farmer.
Wallace's Monthly.
Zeitschrift.

The Library is well-lighted and furnished. It is open from 8 a. m. to 5 p. m. on week days. Students have free access to the shelves. Books may be drawn for a period of two weeks. The Library is catalogued according to the Dewey Decimal system, the author-and-title catalogue being complete to date. A comprehensive subject cata-

logue is now being completed. The cards are neatly and legibly written, and systematically arranged in convenient and accessible cabinets.

LITERARY SOCIETIES.

There are two Literary Societies connected with the College—the "Philo-Esthesian" and "Columbian." Students are admitted to these societies by vote of the members. The fees and dues are not burdensome.

CONDITIONS OF ADMISSION.

The College admits students of both sexes, provided they pass a satisfactory examination in the common branches, viz.: Reading, Writing, Spelling, Grammar, Arithmetic, and Geography; and provided they are at least 15 years of age.

The work of the Preparatory year is, in part, a thorough review of Grammar and Arithmetic, with the additional subjects of United States History, Physical Geography, Elocution, Composition, Word Analysis, and Drawing.

Candidates for admission should appear for examination on the dates announced on the calendar of exercises, preferably at the opening of the College year. Those entering later, or proposing to take advanced work, must be prepared to take a more thorough and prolonged series of examinations.

EXAMINATIONS FOR ENTRANCE.

Examinations for admission to the Freshman class are as follows:

In *Reading*, candidates must be able to read understandingly, and with proper accent and emphasis.

In *Writing* and *Orthography*, they must be able to write from dictation, sentences from standard pieces of English literature, both prose and poetry, sufficient in

number to test their qualifications in Penmanship and Orthography.

Candidates will also be required to pass examinations in *Arithmetic, Grammar*, and *Descriptive Geography.*

Candidates for advanced classes or work must be examined on all previous work, or bring certificates of standing from schools having an equivalent grade of work.

Those desiring to enter the Preparatory class must show some knowledge of Grammar, and be examined in Arithmetic, as far as interest, and in Descriptive Geography. They must show a general knowledge sufficient to enable them to take up the work.

Specimen questions follow, so that the candidates may gain an idea as to what will be required upon presenting themselves for entrance to the Freshman class.

Similarly thorough examinations will be made for admission to higher classes in all subjects completed by them:

ARITHMETIC.

1. Given the sum of two numbers and one of the numbers; how do you find the other? Same for product. If same number be added to both minuend and subtrahend, how is the difference affected? Why? If the same number be added to both dividend and divisor, how is quotient affected? Why? If the minuend and subtrahend be multiplied by same number, how is difference affected? Why? If both the dividend and divisor be multiplied by any number, how is the quotient affected? Why? If the subtrahend be increased and the minuend remain unchanged, how is the difference affected? Why? If the dividend be unchanged and the divisor be increased, how is quotient changed? Why?

2. How are fractions added? How multiplied? How divided? How reduced to a desired denominator?

How reduced from common form to decimal form? Give reasons for various operations.

3. How is the value of a note found when partial payments have been made upon it? How is the proceeds of a note found when the note is discounted at a bank? How is the cost of a bill of exchange found?

4. Find the square root of 204,629. Find the cube root of 204,629.

NOTE.—The student's understanding of the principles of Arithmetic, as called for in the preceding questions, of the methods to which they lead, and his skill in applying these, will be thoroughly tested by numerous exercises. He must be thoroughly conversant with the tables of the ordinary English measures, and will find a knowledge of the metric system of measures advantageous.

SPELLING.

1. The *battle* was short and *sanguinary.*

2. At the first *volley* they ran away *accompanied* by their *chief.*

3. If such a *structure* ever *occupied* the ground, it could have been nothing more than a *temporary* affair for the *storing* of *provisions.*

4. At Biel, Switzerland, an *electric turbine*-driven power *transmission* plant has been *established.* The *alternating current* used and the railway shops *served* are two miles *distant.*

5. In the first place, the *prescribed approval* of the *Society* would *virtually clothe* that *organization* with the *appointing* power, while the *burden* of *responsibility* would be placed upon the *Governor.*

6. It must be a *source* of *gratification* to all who have had to do with the *creation* of the Columbian *Exposition* that their *labors* are so *signally recognized* and *their achievements* so *generously lauded.*

7. Upon his *arrival* at Fort Dearborn, Captain Wells *advised* the *destruction* of all extra arms, *ammunition*, and *liquor*, and the *immediate abandonment* of the fort.

8. As *certainly* as the *perception* of an object *lying* in our path warns us *against stumbling* over it; so certainly do *those* more *complicated* and *subtle* perceptions *which constitute science* warn us against *tumbling* over *intervening obstacles* in the *pursuit* of our *distant* ends.

9. *According* to the *custom which* has *descended* from age to age *among* the *monarchs* of the *torrid zone*, Rasselas was *confined* in a *private palace*, with the other sons and *daughters* of Abyssinian *royalty*, till the order of *succession should* call him to the *throne*.

10. The place, *which* the *wisdom* or *policy* of *antiquity* had *destined* for the *residence* of the Abyssinian *princess*, was a *spacious valley* in the *kingdom* of Amhara, *surrounded* on every side by *mountains*, of which the *summits overhang* the *middle* part.

GRAMMAR.

1. Classify sentences, and illustrate each class. Name the essential parts of a sentence.

2. Explain and illustrate the use of the possessive sign. Illustrate the different uses of the participle and the infinitive.

3. Compose sentences illustrating the different kinds of adverbial clauses.

4. Illustrate and explain the distinction between a dependent and an independent clause.

5. Illustrate the offices of *What*, *That*, and *But*.

6. What are the two great classes of conjunctions, and what is their difference?

7. Name and define the modifications of the noun.

8. Give and illustrate the several ways of forming the plural.

9. Parse the words in italics:—The *Teacher told* the pupil *to study* his lesson.

10. Correct where necessary:—Them that study Grammar talk no better than me.

You seen John and he together.

GEOGRAPHY.

1. Locate Pittsburgh, Cleveland, Albany, Washington, Detroit.

2. In going by boat from St. Paul to New Orleans, what principal cities would be passed?

3. Name the principal cities on the Missouri river. On the Ohio river. On the Delaware river.

4. Bound Colorado. What are the chief industries of the state?

5. What countries border on the Mediterranean Sea? On the Red Sea?

6. Locate the Sandwich Islands. For what are they noted?

7. What is latitude? Longitude?

8. Over what waters would a vessel pass in going from London to Calcutta?

9. Between what parallels of latitude does the United States lie?

10. Locate Alaska. Name its largest river. Of what value is the Territory to the United States?

REGULAR AND SPECIAL COURSES.

Unless there are strong and excellent reasons for it, students will not be allowed to take a special course of study, and in case it is allowed, the student must show that he is well-qualified to pursue the studies selected, by passing such examinations as the Faculty may assign. No student will be allowed to change his course during the progress of a term, or will he be allowed to drop a study, unless by permission of the Faculty.

All applications for special courses of study must be made to the Chairman of the Committee on Examinations, by mail or otherwise, at least two days before the opening of the term. Except under unusual circumstances, it will be useless for any person to apply for a special course of study involving less work than is required of the students in the regular courses.

LEAVING COLLEGE.

A student will not be allowed to leave College in term time without leave of absence granted by the President or the Faculty; otherwise the student will be liable to *suspension* or *expulsion*. Temporary leave of absence can be granted by the President, or the officer in charge during his absence. Final separation from the College must be acted upon by the Faculty.

LABOR.

Labor, two hours each school day, is required of all students not excused for physical disability. This labor (see Course of Study) is performed on the farm, or in the garden, in the shops and laboratories, in field work, in irrigation, and in surveying and engineering.

DISCIPLINE.

The discipline of the College is administered by the Faculty according to a system of demerits.

Misconduct, in or out of classes, unexcused absences from any required College exercises, meddling with College property, etc., receive one or more demerits, as the case may seem to require. Parents of students who receive ten demerits will be notified of the students' misconduct by the President; twelve demerits suspend, while fifteen expel the student from the College.

Study hours begin at 7 P. M. and continue until 10 P. M.

GRADES IN WORK AND STUDY.

Each student is expected to maintain a grade of 65, on a scale with 100 as perfect. A student is graded as passed in any study, or branch of manual practice, when the average of his daily progress and his term examination equals 65, on a scale of 100 as perfect.

Failure may be made up, and tested by special examination, or the study must be again taken up with a subsequent class.

MEANS FOR INSTRUCTION AND ILLUSTRATION.

The College Hall, with its new addition, contains large recitation rooms for the following-named departments: Mathematics, English and Stenography, Physics and Irrigation Engineering, History, Literature, and Language; also, commodious Library and reading-rooms, Museum, Zoological Laboratory and recitation-room, with work-room; also offices for officers of the College, rooms for Board of Agriculture, Faculty, etc. Finally, there is a large and well-arranged Assembly room, with opera chairs, for seating 300 persons, stage, retiring-rooms, cloak-rooms, etc., attached, for the convenience and comfort of the school and the public. The whole is heated by steam and admirably lighted by electric lights from the works of the Fort Collins Electric Light Company. The basement is heated and lighted, and contains an Armory, 40x72 feet, for purposes of drill and gymnasium, the heating plant, bath-rooms, rooms for janitor, storage, etc.

The Chemical Laboratory has a lecture-room for forty students; a work or analytic room, with desks for twenty-four students, each desk being supplied with water and gas for the use of each student, and convenient hoods for ventilation; and a Station Laboratory, with balance-room, distillation-room, etc.

The Botanical and Horticultural Laboratory, completed in May, 1890, has fine rooms for instruction and laboratory work, office, tool-room, seed-room, grafting-room, and ample basement room for storage. The conservatory attached, 20x50 feet, contains about 200 species, or 1,000 plants representing many interesting and rare botanical families, and is heated by improved hot-water apparatus.

The orchards and grounds are carefully laid out, and planted to ornamental shrubs and trees. Here we see the plantation of forest trees, the kitchen garden, with its many varieties of vegetables and small fruits, hot-beds, and cold-frames.

The new Agricultural Hall is now completed. It is a very attractive building, constructed of red stone and brick. The entire upper floor is devoted to a spacious hall for class-room work. The first floor is divided into a hallway and four large, comfortable rooms. Here will be found the office of the Professor of Agriculture and Director of the Experiment Station, laboratory, agricultural museum, and seed-room. The basement has four apartments which are used for heating apparatus, temporary dairy department, and storage.

The farm of 240 acres, nearly all under cultivation, includes the experimental ground of about 20 acres, containing three plots, A, B, and C, the first consisting of fifty smaller plots, the second of thirty-three, ranging in size from 1-40 to 1-5 of an acre, and the third of sixteen, containing 1-4 acre each. All are permanently laid with drives and walks, and have iron stakes lettered and numbered to designate the corners. These permanent corner-stakes are four feet long, of which three and one-half feet are driven into the earth. In addition, there are several plats of one acre each, for larger experiments on the farm.

The live stock consists of Clydesdale and Percheron grade draft horses, Short-Horn Durham cattle, Shropshire Down and Merino sheep. A selection of registered hogs, representing the Chester White, Poland China, and Berkshire breeds, has been made. Other representative breeds of stock will be added as rapidly as means and accommodations will admit.

The Mechanic Arts Hall includes a large main building two stories in height, and an ell portion one story high.

The machine-shop occupies the first floor in the north end of the building; it is supplied with a fine assortment of apparatus for working the metals. Around the room are benches, with iron vises fitted for the work in filing and chipping; and connected to the main line-shaft are the following high-grade machines: A Gray 6-foot planer, a Brown & Sharpe Universal milling machine, with gear cutting attachments, a Gould & Eberhardt 15-inch shaper, a 14-inch and a 17-inch engine lathe, and a speed lathe, a Bickford 20-inch drill, a grind-stone, and an emery wheel. In addition, there is supplied a good assortment of gauges, reamers, taps, dies, and other small tools.

At the end of the machine-room is the office of the Professor in charge and the tool-room. In the tool-room are kept such tools as are not in general use, but which are necessary for special work, or such tools as would become injured or lost if scattered around. By an order from the Professor, any tool in the tool-room can be obtained and used by the students. In the west end of the machine-room a space is set off for the experimental work in the testing of materials, valve-setting, testing by brakes, etc. This testing laboratory is supplied with a testing machine, a 12-horse power Hendey & Meyer engine fitted with a Prony brake, a Blake steam-pump, gauges, thermometers, indicators, etc.

AGRICULTURAL CLASS SCORING CATTLE, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

Opening off the machine-room is the engine-room, which is separated from the hall by glass partitions. In this room is the 50-horse power Harris-Corliss engine for running the shops. This engine is supplied with indicator attachment, and the student will be given a chance to take and work up indicator cards. For this purpose the department has a pair of Crosby indicators with extra springs. A dead-weight gauge tester affords a means of correcting steam-gauges.

Opposite the engine-room is the wash-room, with lockers for one hundred students.

Adjoining the wash-room is the boiler-room, containing the large boiler used to furnish the engines with steam and heat the building.

The Department of Engineering and Physics has the class-room fitted with water, electric light from its own dynamo, and curtains for darkening the room for the use of the solar-lantern and stereopticon.

In Physics it has a collection of apparatus both for illustration and experiment, which is at the service of the student when he is prepared to use it. This collection includes a set of U. S. Standard Weights and Measures, furnished by the Government; micrometers; balances; air pumps; induction coil; standard ohm; standard cell; galvanometers; electrometers; voltmeters; ammeters; dynamo; resistence coils, etc., with work-rooms, dark-room, and rooms for laboratory practice.

For use in Engineering and Hydraulics, it has current meters of various patterns, including one electrical registering meter made by Buff and Berger, of Boston; a Darcy-Pitot tube; various instruments to register the rise and fall of water or the amount, one imported from Paris recording the rise and fall of water some twelve or fifteen miles away; an apparatus for the measurement of the flow of water through orifices and over weirs; pressure gauges;

photographs and plans of hydraulic structures; and a collection of slides for the lantern made from negatives taken in this and other countries by the Professor of Engineering. A water motor presented the Department by the Pelton Water Wheel Co., and water meter by the Equitable Meter Co., add to the equipment.

It has five transits, two being supplied with solar attachment; levels; compasses; plane table; leveling and target rods; chains and tapes for land surveying and for engineers' use; odometers; hand levels; planimeter for determining areas; and apparatus for photographic surveying, etc.

A Fairbanks cement tester, with full set of molds, gives the means of testing the strength of cements to 1,000 pounds per square inch. A large 50,000-pound testing machine gives the opportunity to test other materials within the limit.

A complete set of meteorological instruments in daily use, including barometers, thermometers, psychrometers, anemometers, statoscope pluviometers, many of them imported, is available for illustration and study.

The Military Department has one hundred and fifty cadet rifles and two 3-inch rifled field-pieces from the War Department. Each year there is issued a supply of ammunition for both branches of service, in order to give training in infantry skirmish drill, target practice, and artillery firing.

The Scientific Department is supplied with a fine cabinet of specimens, illustrating Botany, Entomology, Geology and Mineralogy, Zoology, and Comparative Anatomy.

LOCATION.

The State Agricultural College is located in Fort Collins, Colorado, the county seat of Larimer County, which is one of the most prosperous agricultural counties in the

COLLEGE BARN, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLORADO.

State. The town contains 2,500 inhabitants, and is beautifully situated about five miles from the foothills, and in full view of Long's Peak and many miles of the Snowy Range. Its supply of water is derived from the melting snows of the mountains; its streets and buildings are finely lighted by an excellent electric light plant; and its sidewalks are exclusively made of excellent flagstone, which is found in large quarries almost at its doors.

The College is at the south side of town; on either side of the Colorado Central Railroad are its buildings and the farm. Visitors are always welcome. They find the town accessible by six trains, which arrive daily from Denver and other points. With the advantages of pure water, a beautiful location, electric lights and steam heat, not much is left to be desired. All the surroundings of the College are favorable to the carrying on of the work which it is its mission to perform.

HISTORY.

The origin of The State Agricultural College of Colorado, like that of its sister institutions in other States, dates back to an act of Congress, passed July 2, 1862. Therein it is proposed to endow in the several States and Territories, by grants of public lands, "*a college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.*"

This act gave the College an endowment of 90,000 acres of land. From this source the College now receives an annual income of nearly $7,000.

The Constitution of Colorado gives the College an independent existence and a permanent home in Fort Collins. Three citizens of the town donated to the State *two hundred and forty acres of land* whereon to erect the necessary buildings. In 1877, the Legislature provided for the support of the College by levying a tax of one-tenth of a mill on all the taxable property of the State. At this time "The State Board of Agriculture" was created, and all matters pertaining to the management of the College were placed under its control. The one-tenth mill levy was increased, in 1879, to one-fifth of a mill. The present levy of one-sixth of a mill dates from an act of the Legislature passed in 1891. The corner stone of the Main College Building was laid July 27, 1878. This building was completed and ready for occupancy early in the following year.

The Legislature, in addition to providing for the support of the College by the mill tax, before named, has made the folowing-named special appropriations:

YEAR.	AMOUNT.	FOR WHAT PURPOSE
1881	$ 5,000	College Dormitory.
1883	$10,000	Mechanic Shop.
1889	$18,000	Extension of Main Building.
1893	$ 6,500	Sewer System.

The State Experiment Stations are intimately connected with the College, and are under the control of its governing board. These stations, five in number, owe their existence to the acceptance, by the State, of the provisions of the Congressional Act, better known as the "Hatch Act," of 1888. The College receives $15,000 a year from the Treasury of the United States for the performance of the experimental work required of the stations.

The College also receives support from the General Government under the provisions of an Act of Congress, passed August 30, 1890, known as the "Morrill Bill." The

first annual payment from this source was $15,000. The act provides that this sum shall be increased $1,000 yearly until it reaches $25,000, when it shall become permanent.

The annual revenues of the College may be summarized as follows:

1. Land Income Fund, derived from interest on money received from sales of land donated by the General Government, and rents of leased lands not yet sold—$7,000.

2. "Hatch Act," support of the United States Experiment Stations—$15,000.

3. United States Fund, "Morrill Bill," in 1893—$18,000. (This will ultimately reach $25,000 per annum.)

4. Special Fund, derived from sale of stock, farm products, and the like (estimate based upon the average for four years)—$2,000.

5. State Tax Fund, one-sixth mill on all the taxable property of the State—$36,000.

Yearly receipts from all sources—$78,000.

An inventory, taken in December, 1892, shows the value of the College buildings, grounds, and equipments to be $176,600.26.

Prior to 1887, but one course of study was pursued by students. Since that date the course has been uniform up to the close of the Sophomore year, and at that point has been differentiated. The following-named courses, from which students can make choice, all lead to the degree of Bachelor of Science, the only degree conferred by the College: Agricultural Course, Mechanical Course, Irrigation Engineering Course, Chemical Course, and Ladies' Course. There is also provision made for a "Short Course of Agriculture," but no degree is conferred upon those who complete it.

The enrollment of students and the number of graduates for each year since the opening of the College, are as follows:

ENROLLMENT.

YEARS.	MALES.	FEMALES.	TOTAL.	GRADUATES.
1880	14	11	25	0
1881	35	22	57	0
1882	49	32	81	0
1883	50	31	81	0
1884	40	37	77	3
1885	50	46	96	6
1886	45	42	87	1
1887	63	42	105	4
1888	71	38	109	4
1889	73	34	107	2
1890	56	18	74	9
1891	77	29	106	3
1892	101	45	146	9
1893	135	44	179	7

All College fees were abolished in January, 1891. *Tuition in all the regular and special classes of the College is free.* There is no charge of any kind for material used in laboratory work or for books taken from the College Library.

A fair statement of the necessary expenses of a student for the College-year of 40 weeks, is as follows:

Board, heat, light, and room-rent	$ 160 00
Cadet uniform	21 00
Laundry expenses	20 00
Books, stationery, etc.,	15 00
Total	$ 216 00

Board in private families can be obtained at from $3.50 to $5 per week. Students who labor on the farm or in the garden receive from 5 cents to 15 cents per hour, according to the quantity and quality of the work performed.

The Library contains 4,172 books and 6,880 pamphlets, and is kept open throughout the year. The will of Mrs.

Anna Jones, deceased, gives the College authorities property valued at $5,000, which is to be sold and the proceeds used in the purchase of books for the Library.

The College now comprises the following-named departments: Agriculture; Botany and Horticulture; Chemistry and Geology; History, Literature, and German; Mathematics; Mechanics and Drawing; Military Science; Physics and Engineering; Zoology and Entomology; English and Stenography; Elocution and Calisthenics; and the Experiment Station.

The work of the College is carried on in strict conformity with a section of the General Laws of the State, which reads as follows:

"The design of the institution is to afford thorough instruction in agriculture and the natural sciences connected therewith. To effect that object most completely, the institution shall combine physical with intellectual education, *and shall be a high seminary of learning*, in which the graduates of the common school, of both sexes, can commence, pursue, and finish a course, terminating in thorough theoretical and practical instruction in those sciences and arts which bear directly upon *agriculture and kindred industrial pursuits.*"

CALENDAR.

1893=1894.

SEPTEMBER.

S	M	T	W	T	F	S
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER.

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	.

NOVEMBER.

S	M	T	W	T	F	S
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12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	..	..

DECEMBER.

S	M	T	W	T	F	S
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10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	.	..	..		..	..

JANUARY.

S	M	T	W	T	F	S
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7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..

FEBRUARY.

S	M	T	W	T	F	S
..	..	..	..	1	2	3
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11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	..	..	..

MARCH.

S	M	T	W	T	F	S
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4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

APRIL.

S	M	T	W	T	F	S
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15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	..	..	..	..

MAY.

S	M	T	W	T	F	S
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	23	29	30	31	..	..

JUNE.

S	M	T	W	T	F	S
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10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

JULY.

S	M	T	W	T	F	S
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8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..

AUGUST.

S	M	T	W	T	F	S
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..

Calendar of Exercises.

1893-1894.

Entrance Examinations	Monday, September 4, 1893
Fall Term begins	Tuesday, September 5, 1893
Fall Term closes	Friday, December 1, 1893
Winter Term begins	Monday, December 4, 1893
Holiday Recess begins	Friday, December 22, 1893
Holiday Recess closes	Monday, January 1, 1894
Winter Term closes	Friday, March 9, 1894
Spring Term begins	Tuesday, March 20, 1894
Baccalaureate Address	Sunday, June 3, 1894
State Board of Agriculture meets	Wednesday, June 6, 1894
Commencement Exercises	Thursday, June 7, 1894

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THE STATE BOARD OF AGRICULTURE
ORGANIZED
March 19, 1877.
COLORADO.